AIR HANDLER

INSTALLATION INSTRUCTIONS

HMG**F1E, HMG**X1E & HCG**V1E Series

IMPORTANT

Please read all information in this manual thoroughly and become familiar with the capabilities and use of your appliance before attempting to operate or maintain this unit. These instructions are primarily intended to assist qualified individuals experienced in the proper installation of this appliance. Some local codes require licensed installation/service personnel for this type of equipment. Improper installation, service, adjustment, or maintenance may cause explosion, fire, electrical shock or other hazardous conditions which may result in personal injury or property damage.

Unless otherwise noted in these instructions, only factory authorized kits or accessories may be used with this product. Keep this manual where you have easy access to it in the future. If a problem occurs, check the instructions and follow recommendations given. If these suggestions don't eliminate your problem, call your servicing contractor.

DO NOT DESTROY. PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE.

TABLE OF CONTENTS

IMPORTANT SAFETY INFORMATION 3

REQUIREMENTS & CODES 3

GENERAL INFORMATION 4
- Before You Install this Unit 4
- Locating the Air Handler 4
- Minimum Clearances 4
- Operation of Air Handler During Construction 4
- Installation in a Garage 5
- Plenums & Air Ducts 5
  - Unconditioned Spaces 5
  - Air Filters 5
  - Acoustical Duct Work 5

AIR HANDLER INSTALLATION 6
- Packaging Removal 6
- Mounting Applications 6
- Upflow Installations 6
- Downflow Installations 6
- Horizontal Installations 7
  - Horizontal Left Installations 7
  - Horizontal Right Installations 7
- Circuit Breaker Cover Installation 8
- Refrigerant Line Connections 8
  - Orifice removal & Installation 9
  - Connecting the Linsets 9
- Condensate Drainage 10

ELECTRICAL CONNECTIONS 11
- Pre-Electrical Checklist 11
- Line Voltage 11
- Grounding 11
- Thermostat Connections 11
- Control Board 12
  - Twinning 12
- Heater Kits 13
- Electronic Air Cleaner 13
- Humidifier 13
- Optional Humidistat 13

STARTUP & ADJUSTMENTS 13
- Before You Start the Unit 13
- Refrigerant Charging 14
- Air Circulation 14
  - Running the Blower Continuously 14
  - Selecting Continuous Low Spd Fan Operation 14
  - Turning the Blower Off 14
  - System Cooling 14
  - System Heating 14
  - Selecting minimum Electric Heat Airflow 14
- Blower Configurations 14
  - Determining Nominal System Capacity 14
  - 3-Speed Units 14
  - High Efficiency Units (Var. & Fixed Speed) 15
  - Selecting Basic Heating Airflow 15
  - Selecting Basic Cooling / Heat Pump Airflow 15
- Dehumidification Options 15

UNIT MAINTENANCE 16

TROUBLESHOOTING 16

FIGURES & TABLES 17
- Figure 12. HMG**F1E, HMG**X1E & HCG**V1E Physical Dimensions 17
- Figure 13. Air Handler Components 18
- Airflow Data 19
  - Table 5. HMG**F1E Air Handlers 19
  - Table 6. HMG**X1E Air Handlers 20
  - Table 7. HMG**X1E Air Handlers (Heat Only) 21
  - Table 8. HCG**V1E Air Handlers (Cool Only) 21
  - Table 9. HCG**V1E Airflow Settings 22
- Electrical Diagrams & Data 23
  - Figure 14. Single Stage Control Board 23
  - Figure 15. Two-Stage Control Board 23
  - Figure 16. Fixed Speed Control Board 24
  - Figure 17. Variable Speed Control Board 24
  - Figure 18. HMG**F1E Wiring Diagram 25
  - Figure 19. HMG**X1E Wiring Diagram 26
  - Figure 20. HCG**V1E Wiring Diagram 27
  - Table 10. HMG**F1E MCA & MOP Data 28
  - Table 11. HMG**X1E & HCG**V1E MCA & MOP Data 29
  - Table 12. Control Board Operation 30

INSTALLATION / PERFORMANCE CHECKLIST 32

IMPORTANT SAFETY INFORMATION

INSTALLER: Please read all instructions before servicing this equipment. Pay attention to all safety warnings and any other special notes highlighted in the manual. Safety markings are used frequently throughout this manual to designate a degree or level of seriousness and should not be ignored. **WARNING** indicates a potentially hazardous situation that if not avoided, could result in personal injury or death. **CAUTION** indicates a potentially hazardous situation that if not avoided, may result in minor or moderate injury or property damage.

⚠ WARNING:

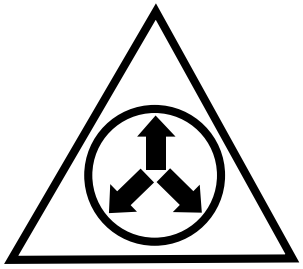
ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD

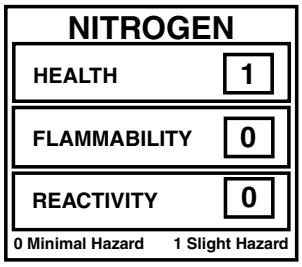
Failure to follow safety warnings exactly could result in serious injury or property damage.

Improper servicing could result in dangerous operation, serious injury, death or property damage.

- **Before servicing, disconnect all electrical power to air handler.**
- **When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.**
- **Verify proper operation after servicing.**

⚠ WARNING:





HMGF1E, HMG**X1E & HCG**V1E air handlers leave the factory with a nitrogen holding charge. Use caution when preparing coils for field connections. If repairs make it necessary for evacuation and charging, it should only be attempted by qualified, trained personnel thoroughly familiar with this equipment. Some local codes require licensed installation service personnel to service this type of equipment. Under no circumstances should the equipment owner attempt to install and/or service this equipment. Failure to comply with this warning could result in equipment damage, personal injury, or death.**

⚠ WARNING:

PROPOSITION 65 WARNING: This product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

REQUIREMENTS & CODES

⚠ WARNING:

This unit must be installed in accordance with instructions outlined in this manual during the installation, service, and operation of this unit. Unqualified individuals should not attempt to interpret these instructions or install this equipment. Failure to follow safety recommendations could result in possible damage to the equipment, serious personal injury or death.

- The installer must comply with all local codes and regulations which govern the installation of this type of equipment. Local codes and regulations take precedence over any recommendations contained in these instructions. Consult local building codes for special installation requirements.
- This equipment contains nitrogen gas. Installation or servicing should only be performed by qualified trained personnel thoroughly familiar with this type equipment.
- All electrical wiring must be completed in accordance with local, state and national codes and regulations and with the National Electric Code (ANSI/NFPA 70) or in Canada the Canadian Electric Code Part 1 CSA C.22.1.
- Installation of equipment may require brazing operations. Installer must comply with safety codes and wear appropriate safety equipment (safety glasses, work gloves, fire extinguisher, etc.) when performing brazing operations.
- Install this unit only in a location and position as specified on pages 4 & 5. This unit is designed only for Indoor installations and should be located with consideration of minimizing the length of the supply and return ducts. See Tables 5 - 9 (pages 19 - 22) and the rating plate for proper circulating airflow data.
- Follow all precautions in the literature, on tags, and on labels provided with the equipment. Read and thoroughly understand the instructions provided with the equipment prior to performing the installation and operational checkout of the equipment.
- This air handler may be used for temporary heating of buildings or structures under construction. See the guidelines listed on page 4.
- Air handler installations in a residential garage must be installed as specified on page 5.

GENERAL INFORMATION

This appliance has been tested for capacity and efficiency in accordance with AHRI Standards and will provide many years of safe and dependable comfort, providing it is properly installed and maintained. Abuse, improper use, and/or improper maintenance can shorten the life of the appliance and create unsafe hazards. Please read all instructions before installing the unit.

Before You Install this Unit

√ This equipment is securely packaged at the time of shipment and upon arrival should be carefully inspected for damage prior to installing the equipment at the job site. Claims for damage (apparent or concealed) should be filed immediately with the carrier.

√ it is recommended that the cooling load of the area to be conditioned should be calculated and a system of the proper capacity selected.

√ Check the electrical supply and verify the power supply is adequate for unit operation. The system must be wired and provided with circuit protection in accordance with local building codes. If there is any question concerning the power supply, contact the local power company.

√ Verify the duct system is appropriate for the air handler being installed. Please note that when replacing an existing system with lower air-flow, the duct system may require modification.

Locating the Air Handler

- Survey the job site to determine the best location for mounting the unit. Consideration should be given to availability of electric power, service access, and noise.
- The dimensions of the room or alcove must be able to accommodate the overall size of the unit and the installation clearances listed in Table 1. Physical dimensions for this air handler are also shown in Figure 12 (page 17).
- The air handler should be set into position before routing the refrigerant tubing.

Minimum Clearances

- This appliance must be installed in accordance with clearances listed in Table 1. The air handler must be installed with ample clearance for easy access to the air filter, blower assembly, heater assembly, controls, and vent connections. Applicable building codes may require additional clearance to equipment. Refer to applicable building codes for details.
- Static pressure drop through louvered openings and through return air plenums should be considered in the overall duct design in the determination of the total external static pressure.

Operation of Air Handler During Construction

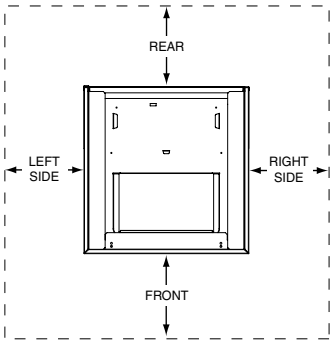
⚠ CAUTION:

Failure to follow these instructions will void the factory warranty and may significantly reduce the life or the performance of the air handler, and/or result in other unsafe conditions. It is the responsibility of the installing contractor to insure these provisions are met.

Operating an air handler in a construction environment can cause the appliance a variety of problems. Proper use of commercial portable space heating equipment during construction is recommended. This air handler may be used during construction if it is not in violation of any applicable codes and the following criteria are met:

- The installation must meet all applicable codes and be permanently installed according to the instructions supplied with the air handler including electrical supply and duct work.
- The air handler must be controlled by a properly installed thermostat that complies with the current provisions of the NEC (ANSI/NFPA 70) and all applicable codes having jurisdiction. Thermostat connections must be made in accordance with instructions supplied with the air handler and thermostat. See pages 11 - 12.
- The installation must include a properly installed filter in the return air system with no by-pass air. The filter must be inspected frequently and replaced when necessary.
- Return air must be supplied unrestricted and located such that dust and gases from construction activity are not introduced into the circulating air system.
- Before occupying the structure: The filter must be replaced or cleaned, the duct work must be inspected and cleaned of any construction debris, and the air

INSTALLATION CLEARANCES	
Left Side..... 0 Inches	Right Side ..... 0 Inches
Back..... 0 Inches	Front..... †See Notes



†NOTES:

Alcove Installations - Allow 24 in. minimum clearance from front of unit to nearest wall or partition for servicing. Recommended clearance is 36 in.

Table 1. Minimum Unit Clearances

handler must be cleaned and/or repaired if found to be dirty, damaged, or malfunctioning in any way by a qualified HVAC technician. The air handler shall be inspected and approved by applicable local authority even if this requires redundant inspections.
- The serial number for the air handler used during construction must be submitted in writing (fax and email also acceptable). This information will be used to track the long-term affects of air handler usage during construction. Proof of this submittal shall be available for the final inspection of the air handler prior to occupancy.

Installation in a Garage

⚠ WARNING:

Do not place combustible materials on or against the cabinet. Do not place flammable materials, (gasoline, paint thinners, etc.) or any other flammable vapors and liquids, in the vicinity of the air handler.

The HMG**F1E, HMG**X1E & HCG**V1E series air handler may be installed in a residential garage with the provision that the unit must be located or protected to prevent physical damage by vehicles**.**

Plenums & Air Ducts
- Plenums and air ducts should be installed in accordance with the standards of the National Fire Protection Association Standard for Installation of Air Conditioning Systems (NFPA 90A), Standard for Installation of Residence Type Warm Air Heating and Air Conditioning Systems (NFPA 90B), and all applicable local codes. NFPA publications are available by writing to: National Fire Protection Association, Batterymarch Park, Quincy, ME 02269 or visit www.NFPA.org online.

⚠ WARNING:

All return ducts must be secured to the air handler using appropriate methods. All return ducts must be adequately sealed. When return air is provided through the bottom of the unit, the joint between the air handler and the return air plenum must be air tight.

Return air and circulating air ducts must not be connected to any other heat producing device such as a fireplace insert, stove, etc. This may result in fire, explosion, carbon monoxide poisoning, personal injury, or property damage.

- Design the duct work according to methods described by the Air Conditioning Contractors of America (ACCA).
- This unit is designed only for use with a return and supply duct. The return air duct must have the same free area as the opening provided on the air handler. The ducts should be appropriately sized to the capacity of the air handler to ensure its proper airflow rating.
- Use transition fittings if the supply and/or return air openings of the unit do not match the duct openings. These transitions should be dimensioned in accordance with standard practice as specified in the ASHRAE recommendations for duct transitions.
- Flexible connectors may be used between the unit and the ductwork to prevent transmission of vibration from the unit to the structure. If electric heater kits are installed, heat resistant material must be used for the flexible connector at the supply air end of the unit.
- It is good practice to seal all connections and joints with industrial grade sealing tape or liquid sealant. Requirements for sealing ducts vary from region to region. Consult with local codes for requirements specific to your area.

Unconditioned Spaces

All duct work passing through unconditioned space must be properly insulated to minimize duct losses and prevent condensation. Use insulation with an outer vapor barrier. Refer to local codes for insulation material requirements.

Air Filters

HMG**F1E, HMG**X1E & HCG**V1E series air handlers are not supplied with an air filter when shipped from the factory. The installer must provide a high velocity filter that is appropriately sized to the return air duct opening or filter rack located in the bottom of the unit. Accessing the filter does not require tools and can be removed from the front of the unit by removing the filter door. See Unit Maintenance (page 16) for filter sizes and installation information.

⚠ WARNING:

Never operate the air handler without a filter or with doors removed. Dust and lint can build up on internal components, resulting in loss of efficiency, equipment damage, and possible fire.

Acoustical Duct Work
- Certain installations may require the use of acoustical lining inside the supply duct work. Acoustical insulation must be in accordance with the current revision of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) application standard for duct liners. Duct lining must be UL classified batts or blankets with a fire hazard classification of FHC-25/50 or less.
- Fiber duct work may be used in place of internal duct liners if the fiber duct work is in accordance with the current revision of the SMACNA construction standard on fibrous glass ducts. Fibrous duct work and internal acoustical lining must be NFPA Class 1 air ducts when tested per UL Standard 181 for Class 1 ducts.
- Damping ducts, flexible vibration isolators, or pleated media-style filters on the return air inlet of the air handler may be used to reduce the transmission of

equipment noise eminating from the air handler. These treatments can produce a quieter installation, particularly in the heated space. However, they can increase the pressure drop in the duct system. Care must be taken to maintain the proper maximum pressure rise across the air handler, temperature rise and flow rate. This may mean increasing the duct size and/or reducing the blower speed. These treatments must be constructed and installed in accordance with NFPA and SMACNA construction standards. Consult with local codes for special requirements. For best sound performance, be sure to install all the needed gaskets and grommets around penetrations into the air handler, such as for electrical wiring.

AIR HANDLER INSTALLATION

The HMG**F1E, HMG**X1E & HCG**V1E Series Air Handler is shipped ready for vertical upflow installation and is approved for attic, basement, alcove/closet or crawlspace installation with zero clearance to combustibles. See Table 1 (page 4) for required installation clearances. **This appliance is approved only for indoor use.**

- The unit must be leveled at installation and attached to a properly installed duct system.
- The surface that the air handler is mounted on must provide sound physical support of the unit.
- The air handler must be installed so that all electrical components are protected from water.
- If a louvered door is installed across the front of this unit, the appliance must be mounted flush or behind front edge of finished wall.
- Always reinstall the doors on the air handler after servicing or cleaning/changing the filters. **Do not operate the air handler without all doors and covers in place.**

Packaging Removal

Remove the shipping crate and User's Manual from the equipment. When removing the crate, use extra care so tubing connectios are not damaged. Do not pull on the coils upper tubes.

Mounting Applications

Vertical only air handlers are factory ready for upflow applications. These units may be applied in downflow applications when applied with the appropriate field kit.

Factory ready horizontal air handlers may be applied in upflow or horizontal-left and -right discharge applications. These units may also be applied in downflow discharge when applied with the appropriate field kit as specified in the units Technical Specifications.

Through-the-floor installations require a 1/4" thick noncombustible resilient gasket to be used whenever the supply or return air ducts pass through the floor. The gasket should be positioned between the duct, unit, and floor.

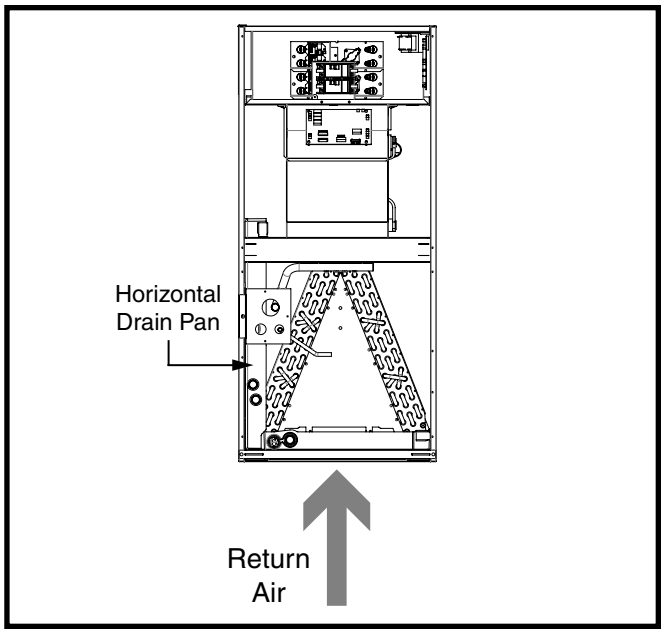


Figure 1. Upflow Installation

Upflow Installations

All air handlers are factory shipped, ready for upflow installation. The horizontal drain pan may be removed from the air handler when installing the unit in an upflow configuration. All return air must enter from the bottom of the unit. A typical upflow unit is shown in Figure 1.

Downflow Installations

The downflow accessory kit (See Technical Specifications) is required for downflow applications. Instructions for installing the downflow accessory kit are included with the kit. It is recommended that the accessory be installed prior to installing the unit. All return air in downflow applications must enter through the top of the unit. A typical installation of the unit in a downflow application is shown in Figure 2.

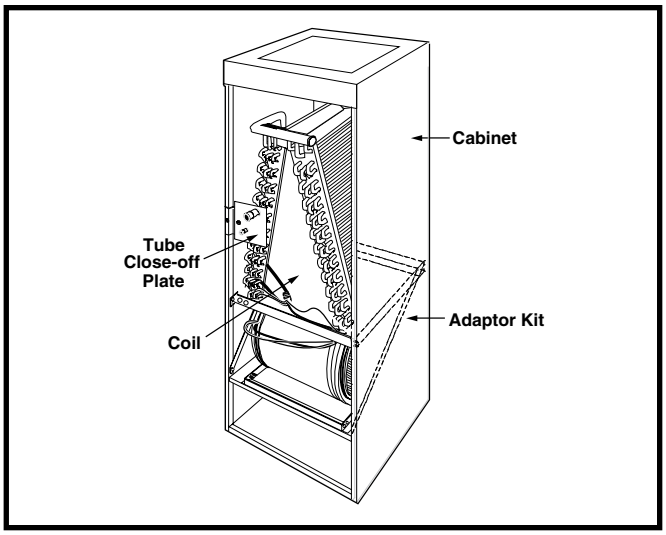


Figure 2. Downflow Installation

Horizontal Installations

These air handlers can be installed horizontally in an attic, basement, crawl space or alcove. It can also be suspended from a ceiling in a basement or utility room in either a right to left airflow or left to right airflow as shown in Figure 3. Air handlers may or may not be shipped from the factory with all the parts required for horizontal left applications and horizontal right applications. If your unit does not have parts for a horizontal application, a kit may be available.

NOTE: In all horizontal applications in which the unit is installed above a finished ceiling and/or living space, a secondary drain pan must be installed under the entire unit to avoid damage to the ceiling in the event of condensate overflow. Additionally, it is recommended that an approved water level indicator or float switch device be used to shut down the unit in the event water is detected in the auxiliary drain pan.

If suspending the air handler from the ceiling, assemble a support frame (Figure 4) using slotted iron channel and full threaded rod. Fasten the frame together with nuts, washers, and lockwashers. Secure the support frame to the rafters with lag bolts. The air handler can also be suspended using steel straps around each end of the unit. The straps should be attached to the air handler with sheet metal screws and to the rafters with bolts.

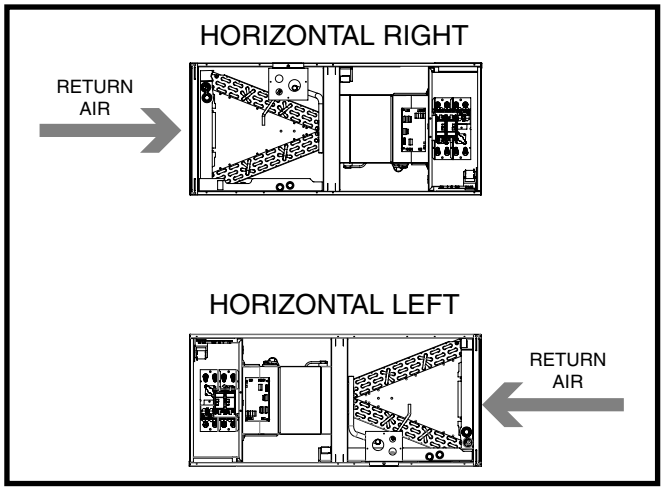


Figure 3. Horizontal Configurations

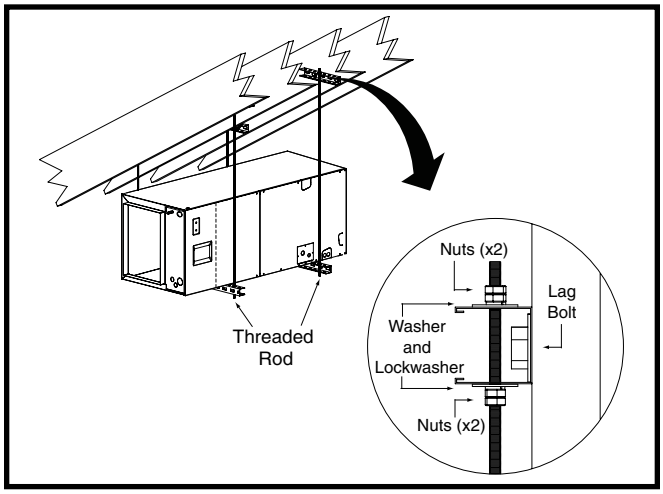


Figure 4. Unit Horizontally Suspended

Horizontal Left Installations:

1. Remove the coil access door.
2. Remove the plug from one of the threaded holes in the horizontal drain pan. Completely remove the webbing located in the threaded holes of the horizontal drain pan. **IMPORTANT:** If the webbing is not removed, the condensate will not drain properly and ceiling damage may occur.
3. Insert the plug (from horizontal drain pan) into the open and unused drain hole in the drain pan at the bottom of the unit to block bypass air.
4. Remove the corresponding drain line knockout from the coil access door to allow access to the horizontal drain.
5. Replace the door and attach the drain line.

Horizontal Right Installations:

1. Remove the coil access door. Unscrew the line-set tube close-off plate from the front left cabinet rail.
2. Slide the coil and drain pan assembly out of the unit.
3. Remove the sheet metal hairpin covers (if supplied) from the back of the coil and discard.
4. Place the horizontal drain pan on the opposite side of the coil. On units with 2 sets of knockouts, remove the other set of knockouts in the coil spacing plates and insert support rod.
5. Slide the coil and the horizontal drain pan assembly back into the unit. Re-attach the tube close off plate.

   NOTE: For 24K & 30K BTUH applications, it may be preferrable to remove the blower assembly prior to installing the coil & drainpan. In this case follow instructions 1-4 as listed above but also remove the blower access door and blower assembly. The blower assembly is secured with two screws on either side near the front. With these removed the blower assembly can slide out of the front of the unit. Install the coil and drain pan as described in step 5 and then replace the blower assembly. Take care to ensure that the flanges on the sides of the blower assembly are captured by the pockets in the blower deck. It may be necessary to lift the blower assembly during insertion to allow the lower blower leg to clear the side of the drain pan. The blower will stop against the back of the blower deck. Replace the two screws and the blower access door and procede with steps 6-9.

6. Remove the plug from one of the threaded holes in the horizontal drain pan. Completely remove the webbing located in the threaded holes of the drain pan.

   IMPORTANT: If the webbing is not removed, the condensate will not drain properly and ceiling damage may occur.

   NOTE: It is recommended that the suction line be insulated up to the coil inside of the cabinet.

7. Insert the plug (from horizontal drain pan) into the open and unused drain hole in the drain pan at the bottom of the unit to block bypass air.
8. Remove the corresponding drain line knockout from the coil access door to allow access to the horizontal drain.
9. Replace the door and attach the drain line

Circuit Breaker Cover Installation

The air handler circuit breaker cover is designed to protect the breakers of an installed heater kit from debris and condensation.The cover attaches to the breaker recess of the air handler upper access door using a double-sided adhesive gasket. See Figure 5. The heater kit circuit breaker toggles are still accessible and can be switched with the cover in place.

There are 2 different circuit breaker cover sizes:
- 2-breaker cover for 2, 2.5, 3, 3.5, & 4 ton air handlers.
- 3-breaker cover for 5 ton air handlers.

After the heater kit is properly installed, remove the appropriate knockouts in the upper air handler access door and follow these instructions to install the breaker cover:

1. Clean any oil, dirt, or insulation fibers from the recess area of the air handler access door.This step is important for ensuring the gasket adheres properly to the sheet metal door.
2. Remove release paper from one side of the gasket and attach to back side of the breaker cover. **NOTE:** For proper alignment, It is recommended to leave the center section of the gasket in place when attaching the gasket to the breaker cover. Remove the center section after the gasket is applied to the breaker cover.

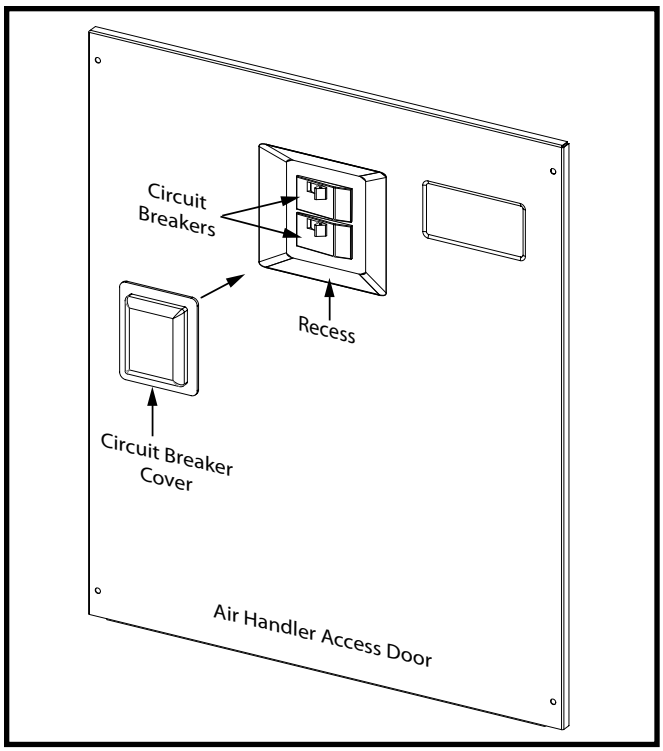
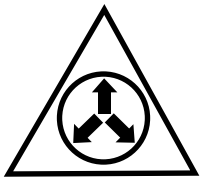


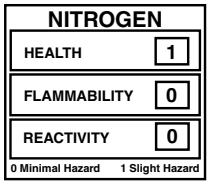
Figure 5. Circuit Breaker Cover

3. Remove the release paper from the other side of the gasket and attach to the circuit breaker recess area.
4. Press firmly along all four sides of the cover to ensure gasket and cover are securely attached to the access door.

Refrigerant Line Connections

⚠ WARNING:





The coil in the air handler is factory shipped with a nitrogen charge. Avoid direct face exposure or contact with valve when gas is escaping. Always ensure adequate ventilation is present during the depressurization process. Address any uncertainties before proceeding. Failure to comply with this warning could result in equipment damage, personal injury, or death.

- The installer should make every effort to ensure the field installed refrigerant containing components of the system have been installed in accordance with these instructions and sound installation practices for reliable system operation and longevity.
- The air handler coil does not contain a refrigerant charge. Refer to the installation instructions supplied with the outdoor unit for refrigerant charge information.
- Always refer to the installation instructions supplied with the outdoor unit for piping requirements. The suction and liquid lines must be sized in accordance with the condensing unit specifications. See Figure 12 (page 17) for liquid and suction line locations.
- When connecting refrigerant linesets together, it is recommended that dry nitrogen be flowing through the joints during brazing. This will prevent internal oxidation and scaling from occurring.
- Refrigerant tubing should be routed in a manner that minimizes the length of tubing and the number of bends in the tubing. It should be supported in a manner that prevents it from vibrating or abrading during system operation. Tubing should be kept clean of foreign debris during installation.
- If precise forming of refrigerant lines is required, a copper tubing bender is recommended. Avoid sharp bends and contact of the refrigerant lines with metal surfaces.
- Refrigerant lines should be wrapped with pressure sensitive neoprene or other suitable material where they pass against sharp sheet metal edges.
- HMG**F1E, HMG**X1E & HCG**V1E Series air handlers are charged through service valves on the end of the liquid tube for each circuit. These must be removed before brazing the line sets.

Orifice Removal & Installation

The orifice installed in the air handler has been sized for use with the most popularly matched outdoor units. The orifice size as shipped from the factory is listed on the air handler rating plate. Perform steps 1 - 9 to confirm that the orifice size meets the requirements outlined in the outdoor unit installation manual.

1. Remove the cap from the end of the liquid line.
2. Verify pressurization by depressing the Schrader valve on the end of the liquid line. Listen for any escaping gas. If there is no pressure, test the coil for leakage.
- If leakage is found, clearly mark the location of the leak and return the coil to the distributor for processing.
- If no leaks are found, the coil may be installed.

3. Depress the valve to relieve all pressure from the coil.
4. Remove and discard the valve core.

⚠ CAUTION:

To prevent damage to the unit or internal components, it is recommended that two wrenches be used when loosening or tightening nuts. Do not over tighten!

5. Using two wrenches, loosen the nut and distributor body as shown in Figure 6. Turn the assembly nut counter-clock-wise until the orifice body halves are seperated.
6. Insert a light-gauge wire hook between the distributor body and the restrictor orifice while being careful not to scratch either part. Carefully remove the restrictor orifice from the distributor body. See Figure 7.
7. Check the actual size of the new orifice. **NOTE:** The size is stamped on its side. Do not use pin gauges to measure the orifice diameter.
8. Insert the new orifice into the distributor body, rounded end down. See Figure 8.

⚠ CAUTION:

To prevent damage to the unit or internal components, it is recommended that two wrenches be used when loosening or tightening nuts. Do not over tighten!

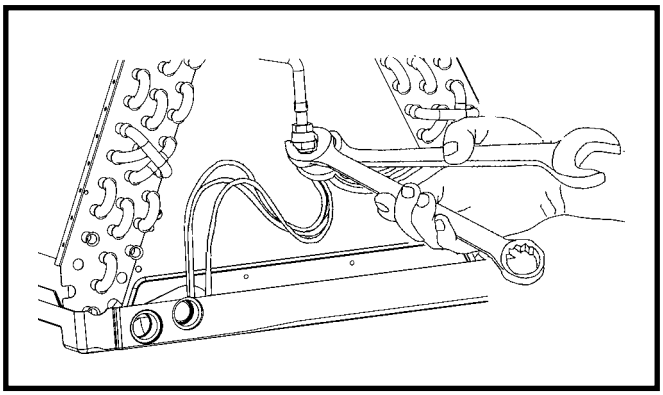


Figure 6. Loosening of Nut & Distributor Body

9. Realign the assembly nut on the distributor body and hand tighten both components. Mark a line on both bodies and then tighten an additional 1/4 turn using two wrenches. The movement of the two lines will show how much the nut is tightened. If a torque wrench is used, tighten to 10-12 ft. lbs. or 14-16 Nm.

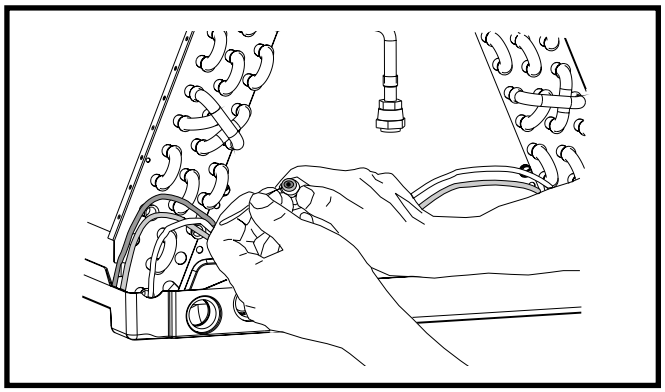


Figure 7. Removal of Orifice

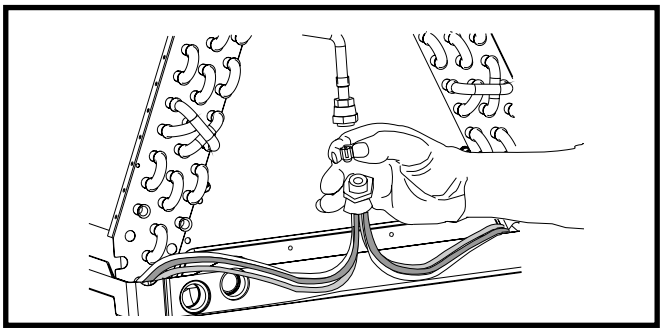


Figure 8. Restrictor Insertion into Distributor Body

Connecting the Linesets

IMPORTANT NOTES FOR HORIZONTAL OR DOWNFLOW INSTALLATIONS WITH TXV VALVE:

- **The sensing bulb must be located flush against the suction line for optimum heat transfer.**
- **Avoid attaching the sensing bulb to the lowest part of the suction line where condensate may accumulate.**
- **Do not locate the sensing bulb on vertical sections of the lineset.**
- **For horizontal lines, the bulb should not be located at 12 or 6 o'clock position of the suction line. The best location is at 4 or 8 o'clock.**
- **For additional information on proper sensing bulb locations, please refer to the valve manufacturer's instructions.**

IMPORTANT: The steps in the Orifice Removal & Installation section must be performed before the linesets are connected.

1. Remove grommets from line set holes.

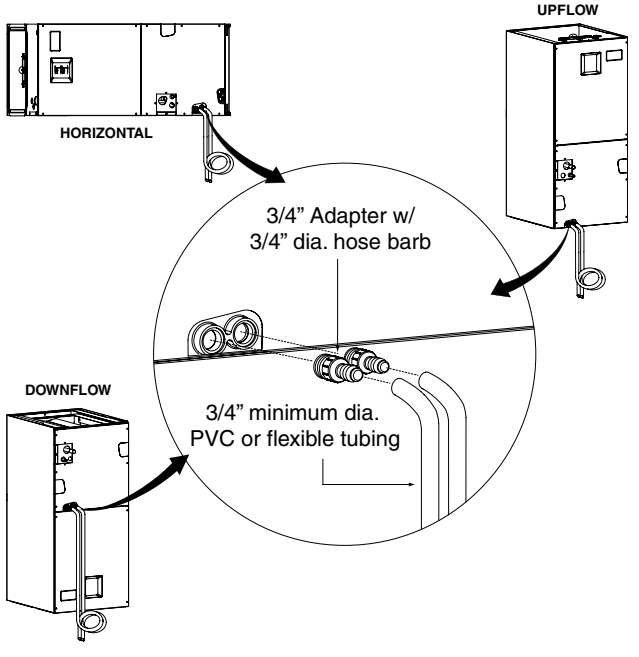
⚠ CAUTION:

It is recommended that a wet rag be wrapped around the suction line in front of the close off plate or the sensing bulb (if TXV is installed) before applying heat. Failure to keep components cool during brazing may result in structural damage, premature equipment failure, or possible personal injury.

2. Unbraze and remove the cap on the suction line.
3. Route and cut both lineset tubes to proper length in accordance with the outdoor unit specifications. Verify the ends are round, clean, and free of any burrs.
4. Position grommet on line set with sufficient distance away from brazing area. Brazing processes can permanently damage grommets.
5. Connect the suction and liquid lineset tubes.

⚠ CAUTION:

It is recommended that a wet rag be wrapped around the suction line in front of the close off plate or the sensing bulb (if TXV is installed) before applying heat. Failure to keep components cool during brazing may result in structural damage, premature equipment failure, or possible personal injury.



NOTES:
1. The drain lines must maintain a downward slope to ensure proper condensate drainage.
2. Each condensate drain must be trapped separately using a J-Trap or field supplied loop.

Figure 9. Condensate Drainage Example

6. Braze the individual connections with dry nitrogen flowing through the joints. **NOTE:** This will prevent internal oxidation and scaling from occurring.
7. Wrap the refrigerant lines with pressure sensitive neoprene or other suitable material especially where the lines enter the opening in the sheet metal.
8. Evacuate the system of moisture and non-condensables to prevent low efficiency operation or damage to the unit. The suggested range of evacuation is 350 - 500 microns.
9. Charge the system with refrigerant. Refer to the outdoor unit installation manual for additional charging instructions.
10. Check the system for leaks, including the lineset and the brazed joints.
11. Replace all grommets and properly dispose of all removed parts.

Condensate Drainage

⚠ CAUTION:

The air handler must be level to ensure proper condensate drainage. An unlevel installation may result in structural damage, premature equipment failure, or possible personal injury.

- Methods for disposing of condensate vary according to local codes. Refer to local codes or authority having jurisidiction for restrictions and proper condensate disposal requirements.
- The drain pan that is supplied with this air handler contains a primary and secondary drain fitting. The condensate is drained from the unit through two 3/4" female pipe fittings located on the front side of the unit as shown in Figure 9.
- The drain pan must be drained with field supplied tubing or pvc pipe and adequately trapped. Both drain tubes must have a minimum diameter of 3/4" and be trapped separately.

  IMPORTANT: Failure to install a trap may result in condensation overflowing the drain pan, resulting in substantial water damage to surrounding area.

- Route both lines to a suitable drain, avoiding sharp bends and pinching of the lines. The drain should maintain a minimum horizontal slope in the direction of discharge of not less than 1" vertical for every 10 ft of horizontal run.
- If the air handler is located in or above a living space where damage may result from condensate overflow, an auxiliary drain pan shall be installed under the unit. A separate drain line should extend from the pan to a conspicuous point and serve as an alarm indicating that the primary drain is restricted. As an alternative to a separate drain line, an approved water level indicator or float switch device may be used to shut down the unit in the event water is detected in the auxiliary pan.

- Install a single 5 inch trap in the condensate drain line as close to the coil as possible. Make sure that the top of the trap is below the bottom of the drain pan to prevent the condensate from overflowing the drain pan. **NOTE:** There must be only one trap in the drain line. Using more than one trap may prevent drainage.
- Prime the trap with water. Insulate the drain if it is located in an unconditioned space, and test the condensate line for leaks. Consult local codes for additional restrictions or precautions.
- During system checkout, inspect the drain line and connections to verify proper condensate drainage.

ELECTRICAL CONNECTIONS

⚠ WARNING:

ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury or property damage.

Improper servicing could result in dangerous operation, serious injury, death or property damage.

- **Before servicing, disconnect all electrical power to the air handler.**
- **When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly**.
- **Verify proper operation after servicing.**

- Electrical connections must be in compliance with all applicable local codes and ordinances, and with the current revision of the National Electric Code (ANSI/NFPA 70).
- For Canadian installations, the electrical connections and grounding shall comply with the current Canadian Electrical Code (CSA C22.1 and/or local codes).

Pre-Electrical Checklist:

√ Verify the voltage, frequency, and phase of the supply source match the specifications on the unit rating plate.

√ Verify that the service provided by the utility is sufficient to handle the additional load imposed by this equipment. See the unit wiring label or Tables 9 - 10 (pages 28 - 29) for proper high and low voltage wiring.

√ Verify factory wiring is in accordance with the unit wiring diagram (Figures 18 - 20, pages 25 - 27). Make sure the connections didn't loosen during shipping or installation.

Line Voltage

- **An electrical disconnect must be located within sight of and readily accessible to the unit**. This switch shall be capable of electrically de-energizing the outdoor unit. See unit data label for proper incoming field wiring. Any other wiring methods must be acceptable to authority having jurisdiction.
- It is recommended that the line voltage to the unit be supplied from a dedicated branch circuit containing the correct fuse or circuit breaker for the unit.
- Overcurrent protection must be provided at the branch circuit distribution panel and sized as shown on the unit rating label and according to applicable local codes. See the unit rating plate and Tables 10 & 11 (pages 28 & 29) for maximum circuit ampacity and maximum overcurrent protection limits.
- The installer should become familiar with the wiring diagram/schematic before making any electrical connections to the unit. See the unit wiring label or Figures 18 - 20 (pages 25 - 27).
- Use only copper wire for the line voltage power supply to this unit. Use proper code agency listed conduit and a conduit connector for connecting the supply wires to the unit. Aluminum supply wire may be used if a heater kit is installed.
- If replacing any of the original wires supplied with the unit, the replacement wire must be copper wire consisting of the same gauge and temperature rating.
- Provide power supply for the unit in accordance with the unit wiring diagram, and the unit rating plate. Use UL listed conduit and conduit connectors for connecting the supply wires to the unit and for proper grounding. Field supplied bushings for the power supply cables must be added to support and protect the power supply cables.
- All 208/230 Volt units are shipped from the factory wired for 240 volt operation. For 208V operation, remove the lead from the transformer terminal marked 240V and connect it to the terminal marked 208V.

Grounding

⚠ WARNING:

The unit cabinet must have an uninterrupted or unbroken electrical ground to minimize personal injury if an electrical fault should occur. Do not use gas piping as an electrical ground!

This unit must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code (ANSI/NFPA 70) or the CSA C22.1 Electrical Code. Use the grounding lug provided in the control box for grounding the unit.

Thermostat Connections

- Thermostat connections shall be in accordance with the instructions supplied with the thermostat. The thermostat used with this equipment must operate in conjunction with any installed accessories. Typical AC and air handler hookups are shown in Figure 10 (page 12).
- Where local codes require that the thermostat wiring must be routed through a conduit or raceway, splices can be made inside the unit; however, all wiring must be NEC Class 1 and separated from incoming power leads.

⚠ CAUTION:

Isolation must be maintained from the external Class 2 output of any transformer in a cooling circuit. Use a thermostat with isolating contacts to prevent inter-connection of Class 2 outputs.

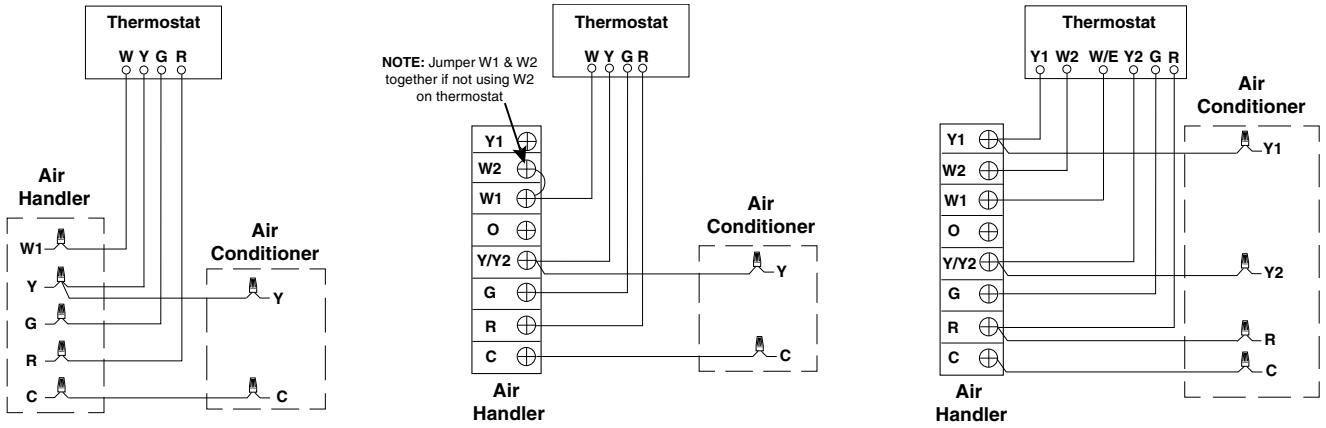
- The thermostat should be mounted about 5 feet above the floor on an inside wall. DO NOT install the thermostat on an outside wall or any other location where its operation may be adversely affected by radiant heat from fireplaces, sunlight, or lighting fixtures, and convective heat from warm air registers or electrical appliances. Refer to the thermostat manufacturer's instruction sheet for detailed mounting and installation information.
- Install the grommet, which is packed with the unit, in the hole for low-voltage wires. Properly connect the low-voltage wiring between the thermostat, outdoor unit, and control board. **NOTE:** When the low voltage wires are positioned in this grommet, the grommet will prevent chafing and/or shorting of the low voltage leads.

Control Board

The control board in the air handler controls the timing sequence of the elements. The board is equipped with a 3 second blower on delay and a 15 second blower off delay in heating and a 40 second blower off delay in cooling. See Figures 14 or 15 (page 23) and Table 12 (pages 29-31) for control board modes and actions.

Twinning

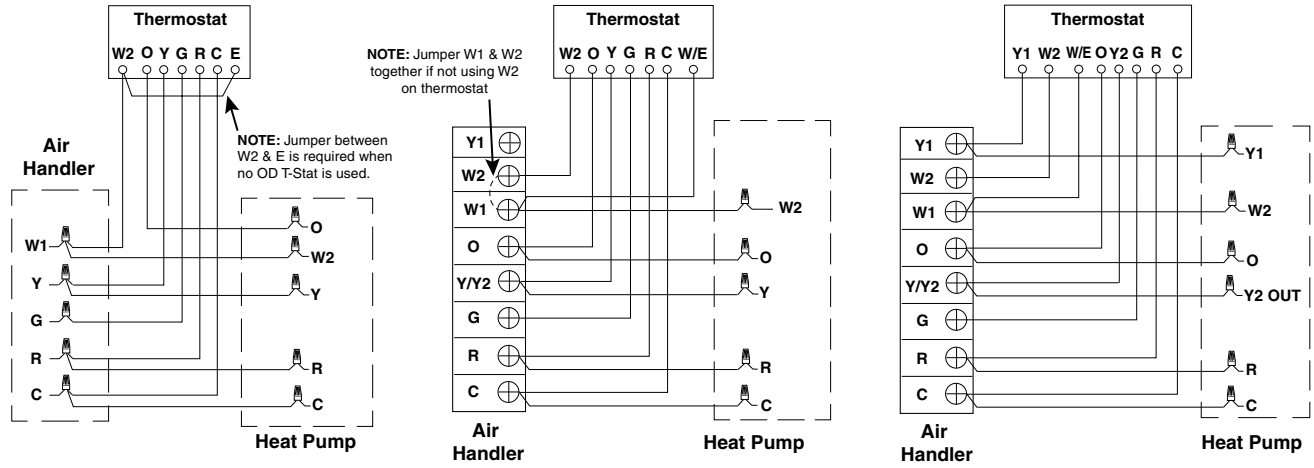
HMG**F1E series air handler's are not supplied with a built in twinning capability. To connect two air handlers to a common single stage AC condensing unit or heat pump, a twinning kit is available for field installation. **Please follow the instructions supplied with the kit.**



Typical Air Conditioner with Standard Air Handler

Typical Air Conditioner with 2-Stage Air Handler

Typical 2-Stage Air Conditioner with 2-Stage Air Handler



Typical Heat Pump with Standard Air Handler

Typical Heat Pump with 2-Stage Air Handler

Typical 2-Stage Heat Pump with 2-Stage Air Handler

Figure 10. Typical Thermostat Connections

NOTE: Variable speed air handlers cannot be twinned.

Heater Kits

When electric heat packages with circuit breakers are field-installed, the circuit breaker may be used as a disconnecting means in most applications. Reference the NEC and local codes for disconnect requirements.

If a heater kit is installed:

The HMG**F1E series air handler is shipped from the factory without an electric heater kit installed. If Electric heat is desired, the H6HK heater kit may be purchased separately and field installed. Determine the correct size heater kit for your unit by referring to the list below or the units rating label.

24K & 30K BTUH..... 15Kw max
36K & 42K BTUH..... 20Kw max
48K & 60K BTUH..... 30Kw max

1. Connect the 2 wire plug of the air handler to the mating 2 wire plug of the heater kit.
2. Connect the line voltage leads to the circuit breaker or terminal block provided.
3. Connect the heater kit plug with the mating receptacle on the air handler control board.

If a heater kit is not installed:

1. Remove the 2 wire plug of the air handler by cutting the wires and discarding the plug.
2. Strip the ends of the 2 air handler wires and connect to the line-voltage leads with the 2 wire nuts provided.

Electronic Air Cleaner (EAC)

The unit has an output to power an electronic air cleaner when the blower is running. This output is rated to 1.0 amp at 208/240V.

Humidifier

The unit has an output to power a humidifier when the blower is running. This output is rated to 1.0 amp at 208/240V.

Optional Humidistat

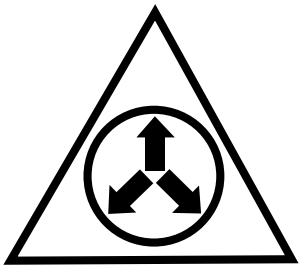
(HMG**X1E & HCG**V1E Models Only)

The optional humidistat may be installed in the return air duct to provide excellent humidity control when needed and maximum system capacity and energy efficiency when humidity levels are normal. The humidistat senses when humidity in the return air stream is above a preset level (field adjustable) and sends a signal to the motor to reduce the airflow so that more moisture may be removed until the humidity level drops. The air handler is pre-programmed for humidistat operation.

Install the humidistat in the return air duct as directed in the installation instructions included with the kit. Wire the humidistat through the low-voltage wire entrance in the air handler to the control board terminal marked **DEHUM**. Wire the humidistat to open on rise in humidity. See Figures 16 & 17 (page 24).

STARTUP & ADJUSTMENTS

⚠ WARNING:



NITROGEN	
HEALTH	1
FLAMMABILITY	0
REACTIVITY	0
0 Minimal Hazard	1 Slight Hazard

The evaporator coil is shipped from the factory with a nitrogen charge. Use caution when preparing coils for field connections. If repairs make it necessary for evacuation and charging, it should only be attempted by qualified, trained personnel thoroughly familiar with this equipment. Some local codes require licensed installation service personnel to service this type of equipment. Under no circumstances should the equipment owner attempt to install and/or service this equipment. Failure to comply with this warning could result in equipment damage, personal injury, or death.

Before You Start the Unit

Prior to start-up, complete the following inspections:

√ Verify the unit is level and properly located with adequate clearances for servicing the unit. See Table 1 (page 4).
√ Check condensate drain line(s) for proper drainage.
√ Verify the surrounding area and top of the unit is free from obstructions and debris.
√ Check all duct connections. Make sure the duct work is adequately sealed to prevent air leakage.
√ Check all coil connections for leaks.
√ Verify that the line voltage power leads are securely connected and the unit is properly grounded. Make sure all doors are installed before restoring power to the unit
√ Verify the thermostat is wired correctly. Make sure all low voltage wires are securely connected.
√ Verify the power supply branch circuit overcurrent protection is sized properly.
√ Verify filter is properly and securely installed.

IMPORTANT: Before starting the unit, install the initial charge on units that are factory shipped with a nitrogen holding charge:

1. Read all installation instructions first.
2. Purge the nitrogen holding charge.
3. Evacuate the unit to 350 - 500 microns.
4. Allow the unit to remain under vacuum for at least 30 minutes.
5. Weigh in the proper amount of new (or reclaimed) refrigerant. Refer to the air conditioner or heat pump installation manual for the proper type and quantity of refrigerant.

Refrigerant Charging

The system refrigerant charge can be checked and adjusted through the service ports provided at the front panel of the outdoor unit. Use only gauge lines which have a Schrader depression device present to actuate the valve.

Air Circulation

Running the Blower Continuously

Set the thermostat's system mode to **OFF** and the thermostat's fan mode to **ON**. The blower motor should run continuously. Check for air delivery at the register(s). Ensure that there are no obstructions at the registers or in the ducts.

Selecting continuous low speed fan operation

(Standard Blower)

The air handler is equipped with an option of continuous low speed fan operation. When **G** is energized without **Y/Y2**, the air handler will operate using the cooling speed. With **G** & **Y/Y2** or **Y/Y2** energized, the air handler will operate in the selected cooling speed (including 40 sec blower-off delay).

Turning the Blower Off

Set thermostat's fan mode to **AUTO**, the blower will shut down immediately.

System Cooling

1. Set the thermostat's system mode to **COOL** and fan mode to **AUTO**. Lower the thermostat's temperature mode below room temperature and observe that the blower energizes. Check the air being discharged at the register is cooler than room temperature. Verify unit refrigerant pressures are in order. Blower should be turning in direction indicated by arrow.

   NOTE: DO NOT alter unit wiring. Listen for any unusual noises. Locate the source and correct as needed.

2. Allow the unit to run for several minutes and then set the thermostat's temperature above room temperature. Verify the blower cycles off with the thermostat.

System Heating

1. Set the thermostat's system mode to **HEAT** and the fan mode to **AUTO**. Increase the thermostat's temperature above room temperature and observe that the blower energizes. Check the air being discharged at the register is warmer than room temperature.
2. Allow the unit to run for several minutes and then set the thermostat's temperature below room temperature. Verify the blower cycles off with the thermostat.

Selecting Minimum Electric Heat Airflow

The minimum electric heat airflow setting controls the minimum air flow that will be produced whenever electric heater kits are used. When the electric heater kit is energized along with a heat pump, the airflow may be higher depending on the basic cooling/heat-pump airflow setting. The minimum electric heat airflow is selected by the red blower wire on 3-speed models or setting switches 1,2,3 & 4 on HMG**X1E models. HCG**V1E models automatically set the heating speed based on the amount of installed heat. The remaining 3 HEAT switches have no function. Switch settings are listed in Table 6 (page 20) or Table 9 (page 22). **NOTE:** For HMG**X1E Models, the minimum electric heat airflow setting may be set higher, but must never be set lower than the setting shown in Table 7 (page 21).

Blower Configurations

Determining Nominal System Capacity

To select the appropriate airflows for the air handler, the nominal system capacity must be known. The nominal system capacity is always the nominal capacity of the outdoor unit. However, in some situations the nominal system capacity may not be the same as the nominal capacity of the air handler. Always refer to the nominal capacity of the outdoor unit to determine the nominal system capacity.

NOTE: The CFM values listed in Table 9 (page 22) are not dependent on duct static pressure. The VSHE motor automatically compensates for changes in duct static pressure (within the limits of the motor).

3-Speed Units

The blower speed is preset at the factory for operation at the same speed for heating and cooling, by using the jumping terminal on the blower motor and connecting it to the desired speed with both the red and black wires connected to the jumping terminal. **NOTE:** The control board is programmed with a 40 second off delay in the cooling mode for optimum system performance and efficiency.

⚠ CAUTION:

To avoid personal injury or property damage, make sure the motor leads do not come into contact with any uninsulated metal components of the unit.

For optimum system performance and comfort, it may be necessary to change the factory set speed. See Table 5 (page 19) for airflow data. To change the blower speed:

1. Disconnect all electrical power to the unit and remove the upper door.
2. Remove the black and red wires from the blower motor jumping terminal. Discard the blower motor jumping terminal.
3. Connect the heating speed wire (red) and the cooling speed wire (black) to the desired blower speed marked on the terminal block of the blower motor.

   - Terminal 4 = Hi speed
   - Terminal 5 = Med speed
   - Terminal 6 = Low speed

4. Replace the upper door and secure it to the unit.
5. Restore power to the unit.

High Efficiency Units (Variable & Fixed Speed)
IMPORTANT! This air handler has been designed to give the installer maximum flexibility to optimize system performance, efficiency, and comfort. Because there are so many different ways to set up the air handler it is important to read and follow these directions carefully.

HMG**X1E & HCG**V1E series air handlers use high efficiency circulating air motors that come in two variations and both are controlled differently. The fixed speed motor control board (Figure 16, page 24) controls the torque and the variable speed motor control board (Figure 17) controls the airflow at a constant CFM. Both boards use the same control board.

Before operation, the air handler must be configured to match the unit with the system, system options, and climatic conditions. When configured, the air handler responds directly to the thermostat inputs, as well as the optional humidistat (see page 13). During normal operation, the motor will gradually change speeds during start-up, shut down, when thermostat inputs change, and when the duct static pressure changes (vents closed or opened, filter clogging, etc.). The air handler is configured by setting the selector switches and removing jumper connectors.

Selecting Basic Heating Airflow
Fixed & variable speed motor control boards (Figures 16 & 17) contain a set of dip switches for setting the blower speed. For HMG**X1E models, pins 1-4 set the speed for heating. For HCG**V1E models, the A/B switch must be set for the appropriate air handler size (either setting can be used for 48K or 60K BTUH applications). The airflow is set automatically based on the amount of installed heat. For both HMG**X1E & HCG**V1E models, the cooling speed is selected via switches 5,6,7,& 8. To determine the appropriate switch settings for your installation, see Tables 6, 7, 8, or 9 (pages 20 - 22).

Selecting Basic Cooling / Heat Pump Airflow
The basic cooling/heat-pump airflow is controlled by setting switches 5 - 8 on the motor control board (mounted on the blower). All airflows for other modes of operation (except electric heat) are determined by this basic setting. FAN ONLY would deliver 50% of the selected cooling airflow. Table 8 (page 21) lists the basic airflow values versus the airflow selector switch settings and ranges of basic air flow settings recommended for each nominal system capacity.

- When operating in the heat pump mode, a higher basic airflow setting will increase the energy efficiency and capacity but will also decrease the supply air temperature.
- For maximum capacity and energy efficiency, select an airflow at or near the top of the range for that nominal capacity. See Table 8 (page 21).
- For maximum dehumidification, select an airflow near the middle or bottom of the range for that nominal capacity. Additional information on humidity control can be found in the Humidistat and Delay Setting sections.
- For thermostats with a dehumidifier output, use a field supplied wire to connect the thermostat's dehumidifier output to the terminal marked **DHUM**. The thermostat should be set so that the **DHUM** output should be high (energized) when dehumidification is needed. See also Dehumidification Options section.

IMPORTANT! If coil icing is observed, the basic cooling/heat-pump airflow selected may be too low. Verify the setting selected is within the range shown in Table 8 and that the the system is properly charged. Please refer to the instructions supplied with the outdoor unit. If icing continues to occur, raise the selected airflow one or two steps.

NOTE: Variable speed air handlers with SEER ratings higher than 15 are matched with a 2-stage cooling outdoor unit. They are programmed to operate at 75% of the selected airflow while the system is in the lo-cool mode and 100% of the selected airflow while in hi-cool mode.

Dehumidification Options

(HMG**X1E or HCG**V1E Models Only)
Both motor control boards (Figures 16 & 17, page 24) have a **DHUM** connection that allows the system to increase the amount of humidity that is removed from the circulating air. This is accomplished by reducing the CFM and allowing the cooling coil to become colder. This will only occur when there is a call for cooling. There are many ways that this can be electrically wired.

1. If the room thermostat incorporates a humidity sensor and **DHUM** output, connect the **DHUM** on the thermostat to the **DHUM** terminal on the motor control board.
2. If using a separate humidistat, connect the **DHUM** & **R** terminals on the humidistat to the **DHUM** & **R** terminals on the motor control board of the air handler. In this option, the **DHUM** output of the humidistat must be set to be normally open and closed when there is a call for humidification. See Figure 11.
3. If a humidistat is not available, it is an acceptable option to connect the **R** & **DHUM** terminals on the motor control board together with a field supplied wire. This option causes the blower to run at a reduced CFM for 10 minutes after a call for cooling. **NOTE:** If outdoor unit is a heat pump, connect the **O** terminal to **DHUM**.

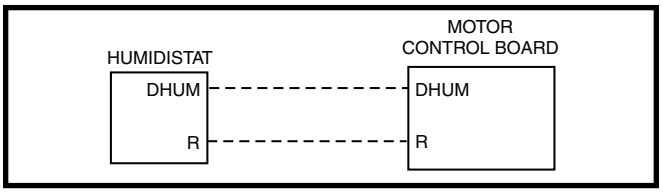


Figure 11. DHUM Wiring Configuration

UNIT MAINTENANCE

Proper maintenance is most important to achieve the best performance from a air handler. Some of the components and their locations are shown in Figure 13 (page 18). If any component of the air handler must be replaced, use only factory authorized replacement parts specified in the Replacement Parts List provided online.

⚠ WARNING:

ELECTRICAL SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury or property damage.

Improper servicing could result in dangerous operation, serious injury, death or property damage.

- **Before servicing, disconnect all electrical power to air handler.**
- **When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly**.
- **Verify proper operation after servicing.**

- These maintenance instructions are primarily intended to assist qualified technicians experienced in the proper maintenance and operation of this appliance.
- Always reinstall the doors on the air handler after servicing or cleaning/changing the filters. **Do not operate the air handler without all doors and covers in place.**
- Verify that the thermostat is properly installed and is not being affected by drafts or heat from lamps or other appliances.
- To achieve the best performance and minimize equipment failure, it is recommended that a yearly maintenance checkup be performed. At a minimum, this check should include the following items:

Air Filter(s)

HMG**F1E, HMG**X1E & HCG**V1E series air handlers are not supplied with a single air filter when shipped from the factory. It is recommended that the filter be cleaned or replaced monthly. Newly built or recently renovated homes may require more frequent changing until the construction dust has minimized. Filter sizes shown in Table 2 are available at most local retailers.

⚠ WARNING:

Never operate the air handler without a filter in place. Dust and lint in the return air can build up on internal components, resulting in loss of efficiency, equipment damage, and possible fire.

Filters designed to remove smaller particles such as pollen, may require additional maintenance.

FURNACE SIZE (BTUH)	FILTER SIZE
24K & 30K	12 x 20 x 1
36K & 42K	18 x 20 x 1
48K & 60K	20 x 20 x 1

Table 2. Filter Sizes

Blower Compartment

Dirt and lint can create excessive loads on the motor resulting in higher than normal operating temperatures and shortened service life. It is recommended that the blower compartment be cleaned of dirt or lint that may have accumulated in the compartment or on the blower and motor as part of the annual inspection.

Blower Fan Wheel

Inspect the blower wheel blades for accumulations of dirt and clean if necessary. Inspect mounting nut for tightness when done.

Blower Motor & Assembly

Inspect the blower assembly and motor mounting brackets for tightness and corrosion. Correct deficiencies if necessary. The blower motor contains sealed bearings and under normal operating conditions, no maintenance is necessary for the life of the equipment.

TROUBLESHOOTING

If the air handler fails to operate, check the following:

- Is the electric turned on?
- Is the thermostat operating properly?
- Are the blower compartment door(s) in place?
- Is the air handler disconnect closed?
- Has the circuit breaker tripped or the control board fuse burned open?
- Are any manual reset switches open?
- Is the filter dirty or plugged?
- Is the LED on both control boards constantly ON? If not, refer to Tables 3 or 4 to determine fault condition.

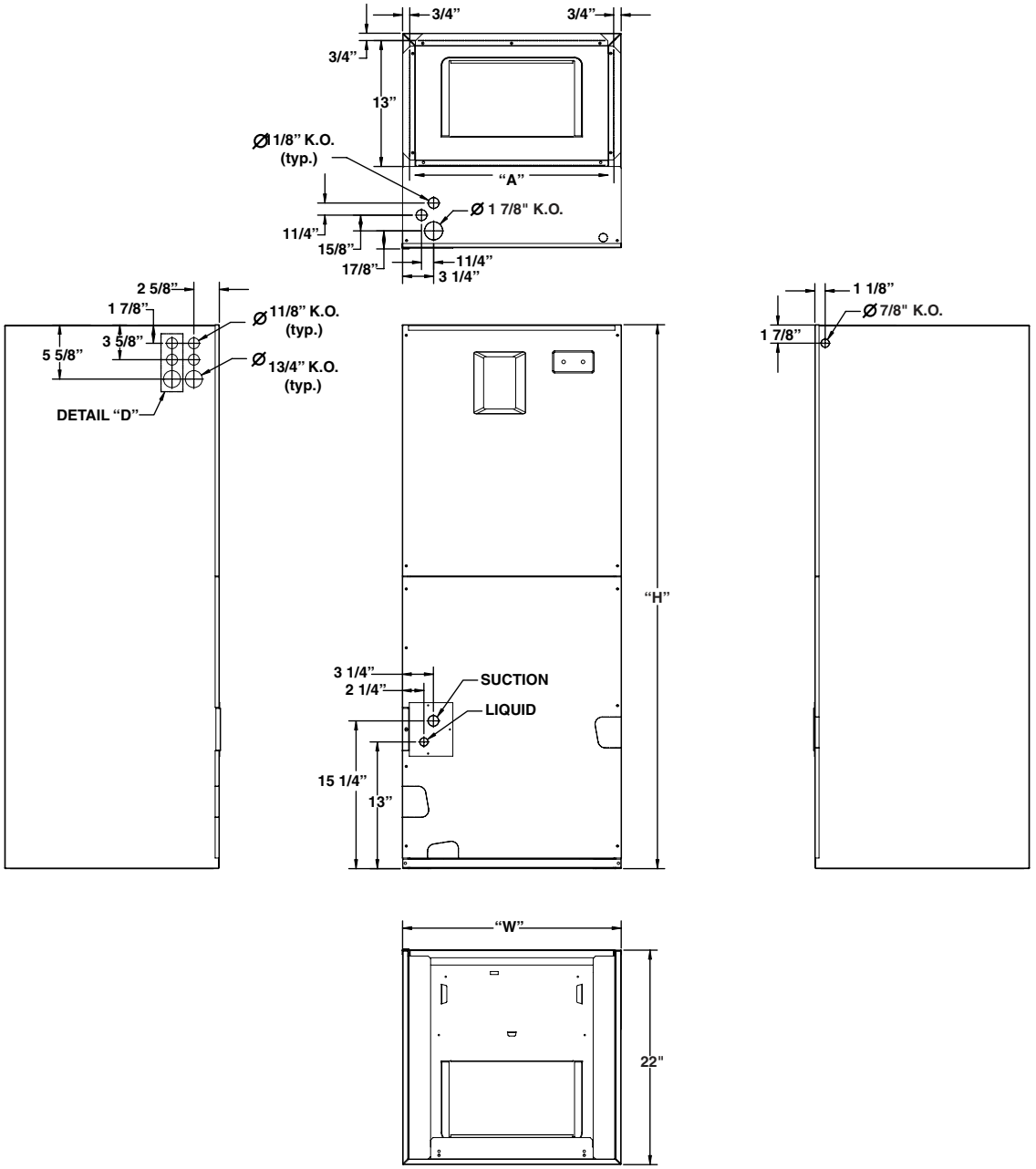
RED LED (AN2)	DIAGNOSTIC
OFF	Control Fault (No Power)
Flash	Blower Fault
ON	Normal Operation

Table 3. Air handler Control Board Fault Conditions

	DIAGNOSTIC	GREEN LED	RED LED
Fixed Speed Furnaces	Control Fault (No Power)	Off	Off
	Normal Operation	On	On
	Motor Fault	On	Flash
	Twin Fault (no motor fault)	Flash	On
	Communications Fault	Flash	Flash
Variable Speed Furnaces	Control Fault (No Power)	Off	Off
	Normal Operation	On	On
	Motor Fault	On	Flash
	Communications Fault	Flash	Flash

Table 4. Motor Control Board Fault Conditions

FIGURES & TABLES



FURNACE SIZE (BTUH)	H	W	A	Detail D
24K & 30K	43-5/16	14-3/16	12-3/4	No
36K (HMG**F1E Only)	43-5/16	19-11/16	18-1/4	No
36K & 42K	49-5/16	19-11/16	18-1/4	No
48K & 60K	55-15/16	22-7/16	21	Yes

Figure 12. HMGF1E, HMG**X1E & HCG**V1E Series Physical Dimensions**

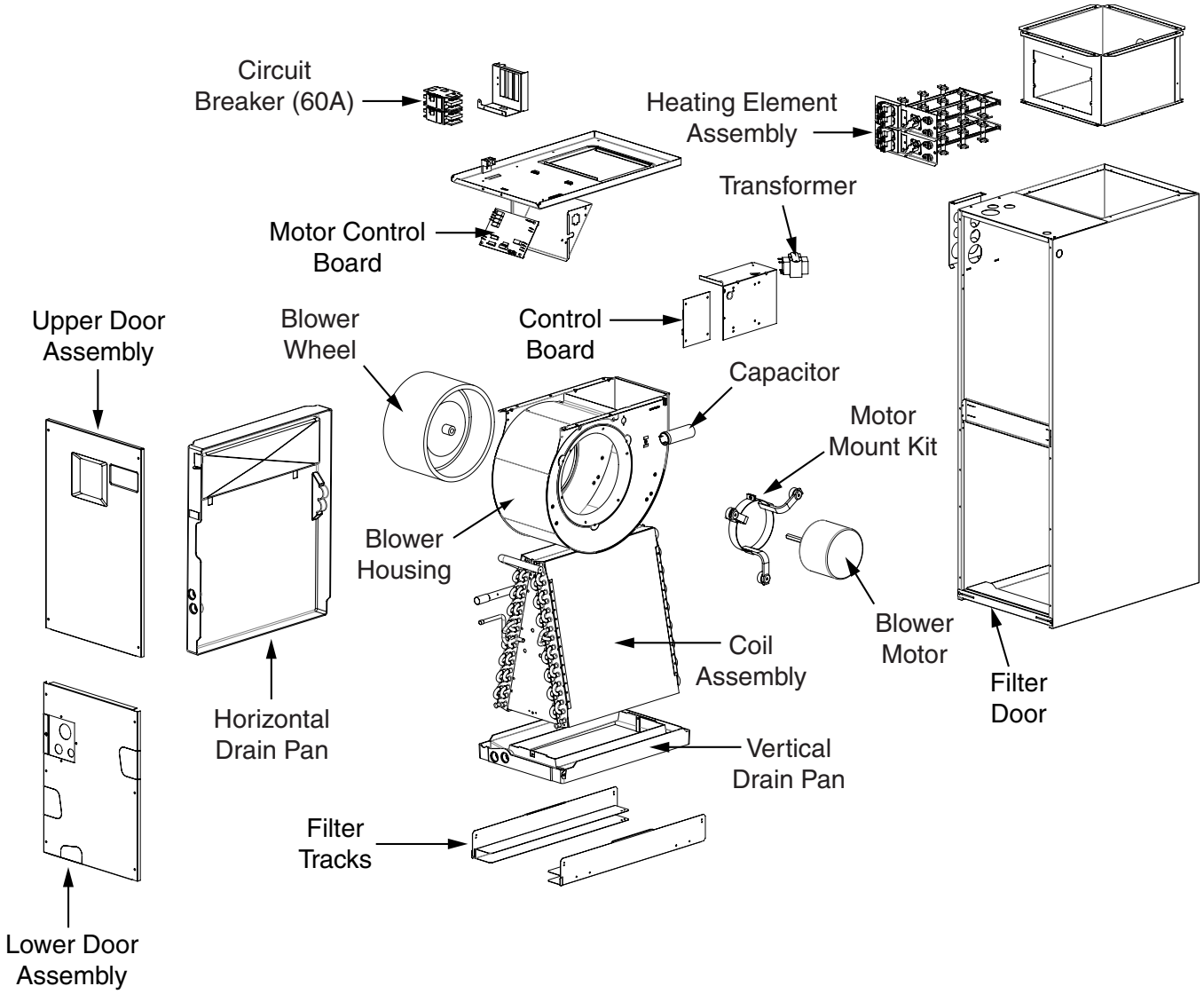


Figure 13. HMGF1E, HMG**X1E & HCG**V1E Series Air Handler Components**

AIRFLOW DATA

Dry Coil ESP		0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80
HMG24F1E	Low	683	647	607	563	515	463	406	345
	Corrected ESP[1]	0.00	0.07	0.19	0.30	0.42	0.53	0.65	0.76
	Medium	861	823	781	734	682	625	564	498
	Corrected ESP[1]	0.00	0.00	0.11	0.23	0.36	0.48	0.60	0.72
	High	1072	1026	975	920	860	797	730	659
	Corrected ESP[1]	0.00	0.00	0.00	0.14	0.27	0.40	0.53	0.67
HMG30F1E	Low	849	825	793	753	704	647	581	508
	Corrected ESP[1]	0.00	0.04	0.15	0.27	0.38	0.50	0.62	0.74
	Medium	1118	1087	1046	997	940	874	799	717
	Corrected ESP[1]	0.00	0.00	0.04	0.17	0.29	0.42	0.55	0.68
	High	1277	1233	1184	1130	1070	1005	935	860
	Corrected ESP[1]	0.00	0.00	0.00	0.10	0.23	0.36	0.49	0.63
HMG36F1E	Low	953	915	871	821	764	701	631	555
	Corrected ESP[1]	0.00	0.04	0.16	0.27	0.39	0.51	0.62	0.74
	Medium	1265	1232	1188	1133	1067	991	903	805
	Corrected ESP[1]	0.00	0.00	0.03	0.15	0.28	0.41	0.54	0.68
	High	1427	1385	1333	1270	1196	1113	1018	913
	Corrected ESP[1]	0.00	0.00	0.00	0.09	0.23	0.36	0.50	0.64
HMG42F1E	Low	1324	1302	1271	1233	1187	1134	1072	1003
	Corrected ESP[1]	0.00	0.06	0.17	0.27	0.38	0.49	0.61	0.72
	Medium	1485	1455	1418	1373	1320	1260	1193	1118
	Corrected ESP[1]	0.00	0.00	0.13	0.24	0.36	0.47	0.58	0.70
	High	1637	1601	1558	1506	1447	1380	1305	1223
	Corrected ESP[1]	0.00	0.00	0.00	0.21	0.33	0.44	0.56	0.68
HMG48F1E	Low	1605	1606	1592	1565	1524	1468	1399	1316
	Corrected ESP[1]	0	0.11	0.21	0.31	0.42	0.52	0.63	0.74
	Medium	1977	1939	1890	1830	1758	1675	1580	1474
	Corrected ESP[1]	0	0	0.18	0.28	0.39	0.50	0.61	0.72
	High	2264	2182	2095	2003	1906	1805	1698	1586
	Corrected ESP[1]	0	0	0	0.26	0.37	0.49	0.60	0.71
HMG60F1E	**Use HMG**X1E airflow data. See Table 5 (page 20).**								

NOTES:

1) Airflow is shown in cfm, +/- 5%.
2) External static pressure (ESP) is shown in inches w.c.
3) See unit nameplate or installation instructions for maximum recommended external static pressure.

Table 5. Airflow Data for HMGF1E Series Air Handlers**

	Switch Settings 0 = OFF, 1 = ON				Cooling or Heating Airflow (CFM) Dry Coil ESP							
	1/5	2/6	3/7	4/8	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
HMG24X1E & HMG30X1E	0	0	0	0	585	550	520	460	420	405		
	1	0	0	0	710	670	650	610	560	530	475	440
	0	1	0	0	845	790	765	715	680	655	625	580
	1	1	0	0	890	865	840	785	760	710	680	655
	0	0	1	0	955	925	900	850	825	790	770	720
	1	0	1	0	1030	995	975	940	910	870	840	815
	0	1	1	0	1115	1085	1060	1020	995	965	925	905
	1	1	1	0	1155	1130	1095	1070	1040	1010	985	950
	0	0	0	1	1200	1175	1145	1110	1085	1060	1025	1000
	1	0	0	1	1240	1215	1195	1170	1140	1110	1080	1060
	0	1	0	1	1320	1290	1265	1240	1215	1185	1160	1130
	1	1	0	1	1355	1330	1305	1280	1255	1220	1200	1175
	0	0	1	1	1405	1375	1345	1325	1295	1275	1250	1210
	1	0	1	1	1440	1415	1385	1355	1325	1290	1255	1215
	0	1	1	1	1465	1425	1390	1355	1320	1290	1260	1215
	1	1	1	1	1465	1425	1390	1355	1320	1290	1260	1215

	Switch Settings 0 = OFF, 1 = ON				Cooling or Heating Airflow (CFM) Dry Coil ESP							
	1/5	2/6	3/7	4/8	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
HMG36X1E & HMG42X1E	0	0	0	0	600	550	430	390				
	1	0	0	0	660	610	540	460	425			
	0	1	0	0	830	750	695	640	580	520		
	1	1	0	0	860	825	765	690	630	600	525	485
	0	0	1	0	935	895	835	790	710	655	620	585
	1	0	1	0	1045	975	920	875	830	795	720	685
	0	1	1	0	1095	1040	995	950	900	850	805	750
	1	1	1	0	1155	1105	1060	1010	965	920	870	825
	0	0	0	1	1230	1185	1140	1090	1045	1010	965	920
	1	0	0	1	1285	1260	1210	1165	1125	1080	1040	1010
	0	1	0	1	1330	1290	1245	1205	1170	1125	1085	1045
	1	1	0	1	1395	1365	1315	1275	1235	1205	1160	1130
	0	0	1	1	1450	1405	1375	1335	1295	1260	1220	1180
	1	0	1	1	1490	1450	1410	1385	1340	1300	1270	1230
	0	1	1	1	1530	1485	1460	1425	1380	1350	1310	1280
	1	1	1	1	1530	1490	1465	1425	1390	1350	1310	1285

	Switch Settings 0 = OFF, 1 = ON				Cooling or Heating Airflow (CFM) Dry Coil ESP							
	1/5	2/6	3/7	4/8	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
HMG48X1E & HMG60X1E	0	0	0	0	710	580	395					
	1	0	0	0	830	690	675	530	505			
	0	1	0	0	930	875	710	665	560	530		
	1	1	0	0	1065	1015	900	840	800	705	665	635
	0	0	1	0	1185	1115	1010	960	925	875	830	745
	1	0	1	0	1275	1220	1175	1120	1060	970	930	890
	0	1	1	0	1365	1350	1255	1200	1150	1105	1060	1025
	1	1	1	0	1480	1430	1370	1325	1265	1225	1185	1140
	0	0	0	1	1560	1535	1485	1430	1375	1335	1285	1240
	1	0	0	1	1650	1600	1545	1500	1450	1405	1360	1305
	0	1	0	1	1730	1685	1660	1610	1570	1520	1470	1420
	1	1	0	1	1785	1740	1695	1645	1615	1545	1510	1470
	0	0	1	1	1865	1820	1785	1750	1695	1655	1605	1560
	1	0	1	1	1920	1890	1850	1805	1765	1715	1675	1640
	0	1	1	1	2010	1965	1960	1900	1850	1810	1775	1730
	1	1	1	1	2065	2020	1985	1955	1915	1880	1840	1810

NOTE: When matched with two-stage outdoor units, the airflow on low (Y1 or W1) input will be 70% of the values shown in this table.

Table 6. Airflow Data for HMGX1E Air Handlers**

FURNACE MODELS	Nominal Electic Heat KW						
	5	8	10	15	20	25	30
HMG24X1E & HMG30X1E	800	900	1000	1300	N/A	N/A	N/A
HMG36X1E & HMG42X1E	900	1000	1100	1300	1500	N/A	N/A
HMG48X1E & HMG60X1E	1000	1100	1200	1400	1600	1800	2000

NOTE: See Table 6 for appropriate switch settings for these airflows.

Table 7. Minimum Heating Airflow Settings (in CFM) for HMGX1E Air Handlers**

HCG24V1E & HCG30V1E					
CFM	SWITCH SETTINGS (1 = ON, 0 = OFF)				NOMINAL CAPACITY
	5	6	7	8	
525	0	0	0	0	1.5 TON
560	0	0	0	1	
600	0	0	1	0	
625	0	0	1	1	
700	0	1	0	0	2 TON
750	0	1	0	1	
800	0	1	1	0	
850	0	1	1	1	2.5 TON
875	1	0	0	0	
890	1	0	0	1	
930	1	0	1	0	
950	1	0	1	1	
1000	1	1	0	0	
1050	1	1	0	1	
1125	1	1	1	0	3 TON
1200	1	1	1	1	

HCG36V1E & HCG42V1E					
CFM	SWITCH SETTINGS (1 = ON, 0 = OFF)				NOMINAL CAPACITY
	5	6	7	8	
525	0	0	0	0	1.5 TON
560	0	0	0	1	
600	0	0	1	0	
650	0	0	1	1	
700	0	1	0	0	2 TON
750	0	1	0	1	
800	0	1	1	0	
850	0	1	1	1	2.5 TON
875	1	0	0	0	
950	1	0	0	1	
1050	1	0	1	0	3 TON
1150	1	0	1	1	
1250	1	1	0	0	3.5 TON
1350	1	1	0	1	
1400	1	1	1	0	
1600	1	1	1	1	4 TON

HCG48V1E & HCG60V1E					
CFM	SWITCH SETTINGS (1 = ON, 0 = OFF)				NOMICAL CAPACITY
	5	6	7	8	
1100	0	0	0	0	3 TON
1200	0	0	0	1	
1250	0	0	1	0	
1300	0	0	1	1	3.5 TON
1350	0	1	0	0	
1400	0	1	0	1	
1450	0	1	1	0	4 TON
1500	0	1	1	1	
1550	1	0	0	0	
1600	1	0	0	1	
1650	1	0	1	0	
1700	1	0	1	1	
1750	1	1	0	0	
1800	1	1	0	1	
1900	1	1	1	0	
2000	1	1	1	1	5 TON

Table 8. Recommended Cooling Airflow Settings for HCGV1E Air Handlers**

	Cooling Airflow						Heating Airflow		
	A/B Switch Setting 0 = OFF, 1 = ON	COOL Switch Setting 0 = OFF, 1 = ON				Airflow (CFM)	A/B Switch Setting 0 = OFF, 1 = ON	Heater Kit Installed (KW)	Airflow (CFM)
		5	6	7	8				
HCG24V1E & HCG30V1E	0	0	0	0	0	525	0	0	600
	0	0	0	0	1	560	0	5	800
	0	0	0	1	0	600	0	8	1000
	0	0	0	1	1	625	0	10	1000
	0	0	1	0	0	700	0	15	1300
	0	0	1	0	1	750	0	20	n/a
	0	0	1	1	0	800	0	25	n/a
	0	0	1	1	1	850	0	30	n/a
	0	1	0	0	0	875			
	0	1	0	0	1	890			
	0	1	0	1	0	930			
	0	1	0	1	1	950			
	0	1	1	0	0	1000			
	0	1	1	0	1	1050			
	0	1	1	1	0	1125			
	0	1	1	1	1	1200			

	Cooling Airflow						Heating Airflow		
	A/B Switch Setting 0 = OFF, 1 = ON	COOL Switch Setting 0 = OFF, 1 = ON				Airflow (CFM)	A/B Switch Setting 0 = OFF, 1 = ON	Heater Kit Installed (KW)	Airflow (CFM)
		5	6	7	8				
HCG36V1E & HCG42V1E	1	0	0	0	0	525	1	0	700
	1	0	0	0	1	560	1	5	900
	1	0	0	1	0	600	1	8	1100
	1	0	0	1	1	650	1	10	1100
	1	0	1	0	0	700	1	15	1300
	1	0	1	0	1	750	1	20	1500
	1	0	1	1	0	800	1	25	n/a
	1	0	1	1	1	850	1	30	n/a
	1	1	0	0	0	875			
	1	1	0	0	1	950			
	1	1	0	1	0	1050			
	1	1	0	1	1	1150			
	1	1	1	0	0	1250			
	1	1	1	0	1	1350			
	1	1	1	1	0	1400			
	1	1	1	1	1	1600			

	Cooling Airflow						Heating Airflow		
	A/B Switch Setting (* = either 0 or 1)	COOL Switch Setting 0 = OFF, 1 = ON				Airflow (CFM)	A/B Switch Setting (* = either 0 or 1)	Heater Kit Installed (KW)	Airflow (CFM)
		5	6	7	8				
HCG48V1E & HCG60V1E	*	0	0	0	0	1100	*	0	800
	*	0	0	0	1	1200	*	5	1000
	*	0	0	1	0	1250	*	8	1200
	*	0	0	1	1	1300	*	10	1200
	*	0	1	0	0	1350	*	15	1400
	*	0	1	0	1	1400	*	20	1600
	*	0	1	1	0	1450	*	25	1800
	*	0	1	1	1	1500	*	30	2000
	*	1	0	0	0	1550			
	*	1	0	0	1	1600			
	*	1	0	1	0	1650			
	*	1	0	1	1	1700			
	*	1	1	0	0	1750			
	*	1	1	0	1	1800			
	*	1	1	1	0	1900			
	*	1	1	1	1	2000			

NOTES:

- Airflow values listed are for 240V operation. For 208V operation, multiply the CFM value by .95 for HCG24V1E, HCG30V1E, HCG36V1E, & HCG42V1E units. For HCG48V1E & HCG60V1E units, mulitply the CMF value by .90.
- When matched with two-stage outdoor units the airflow on low (Y1 or W1) input only will be 70% of the values shown in this table.

Table 9. Airflow Data for HCGV1E Air Handlers**

ELECTRICAL DIAGRAMS & DATA

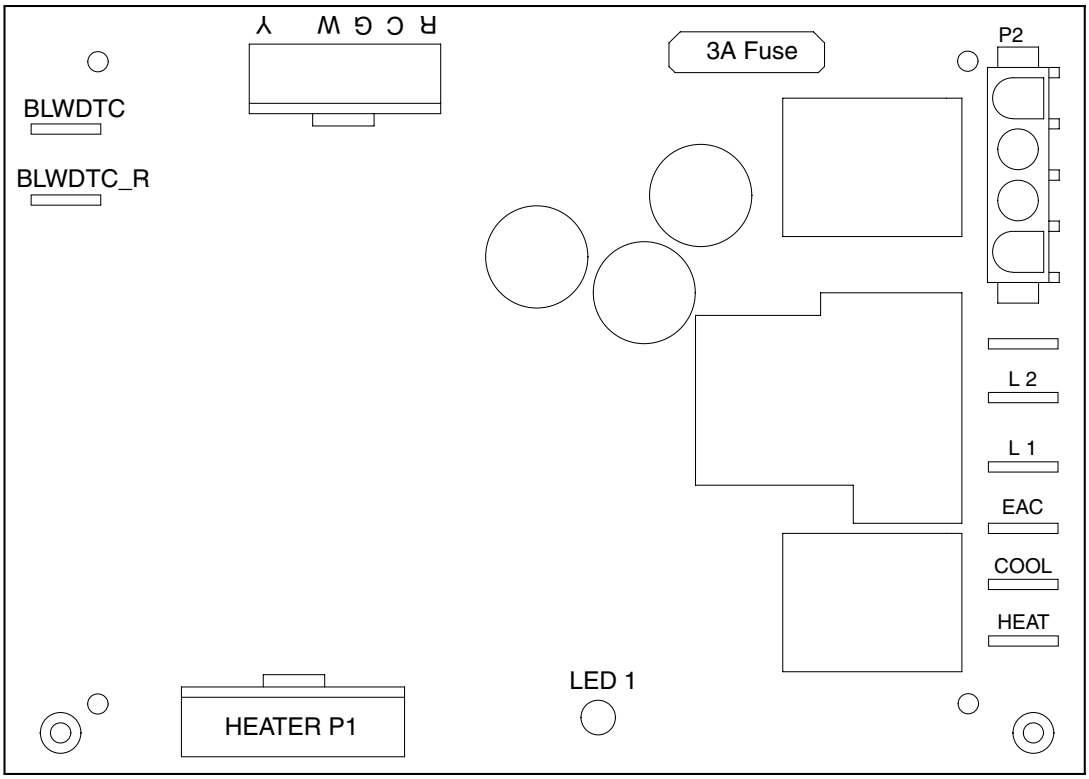


Figure 14. Single Stage Control Board

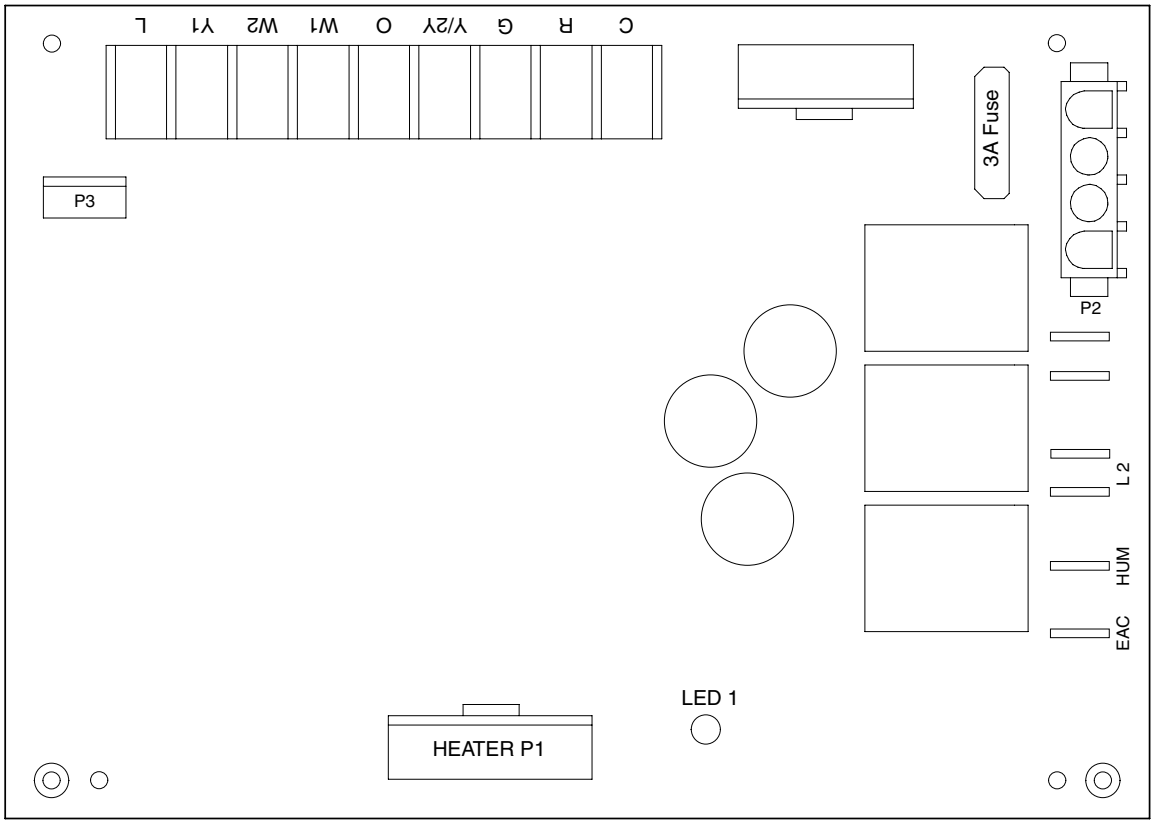


Figure 15. Two - Stage Control Board

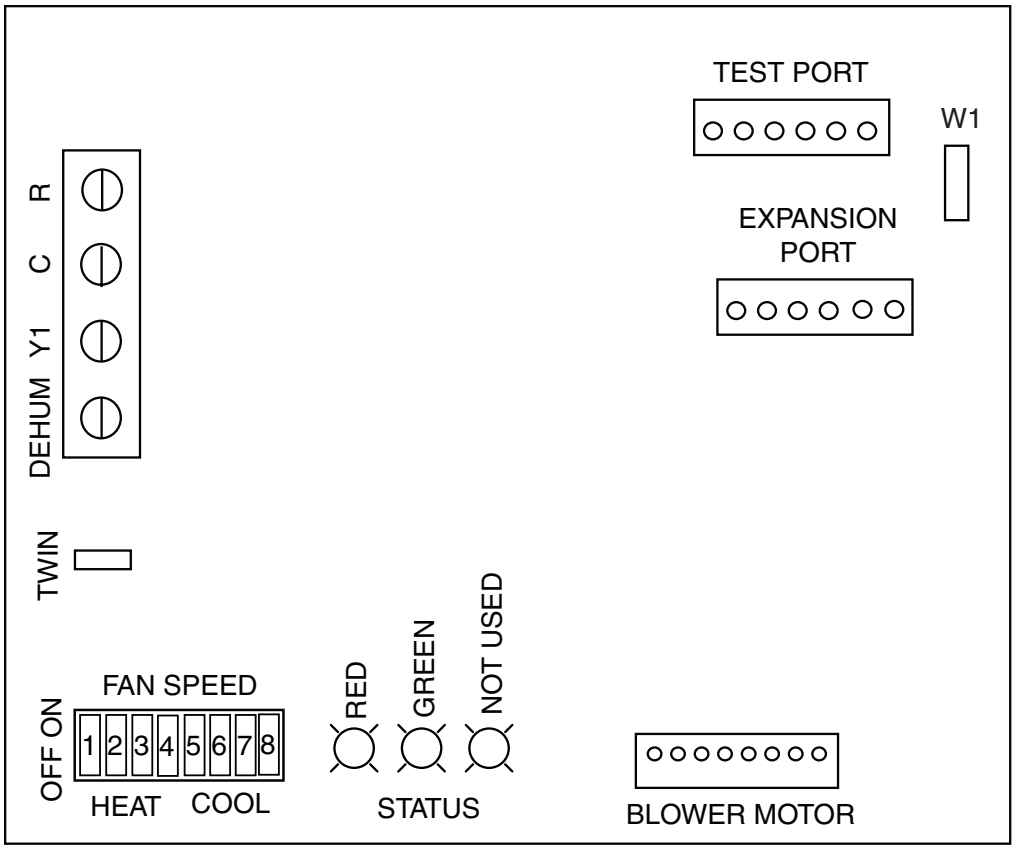


Figure 16. Fixed Speed Motor Control Board

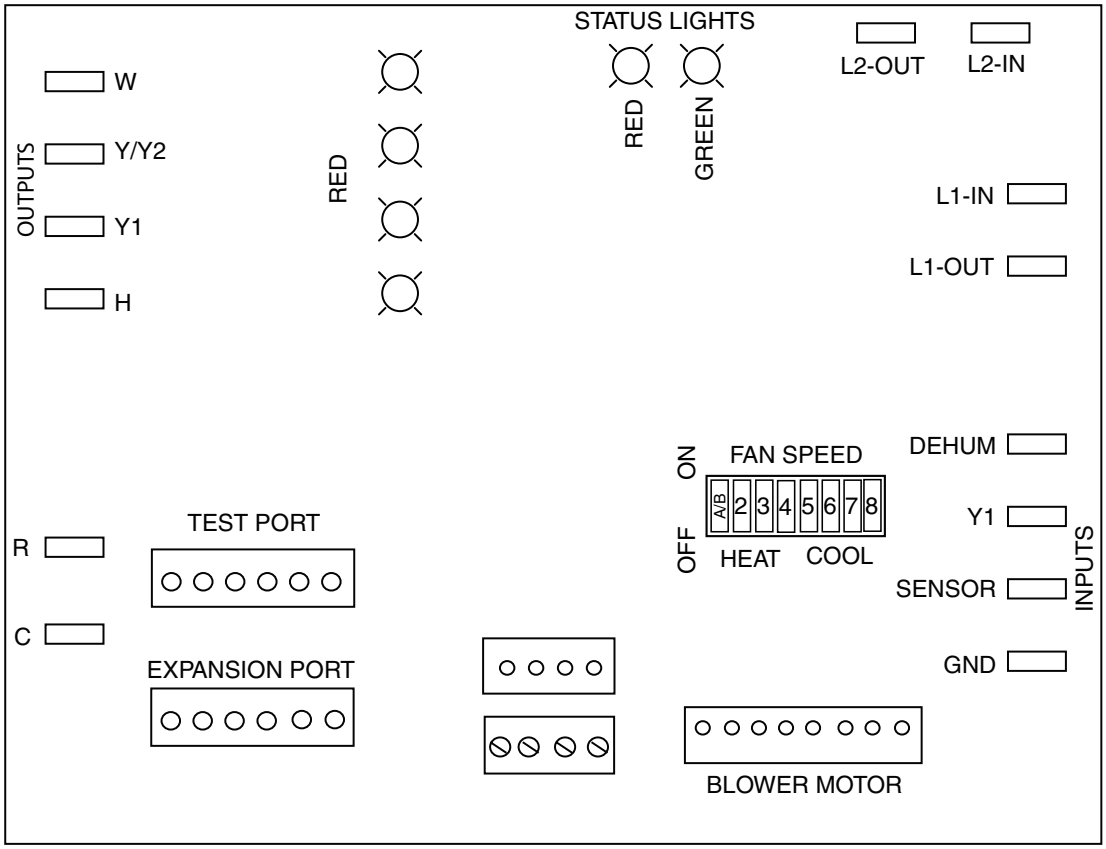


Figure 17. Variable Speed Motor Control Board

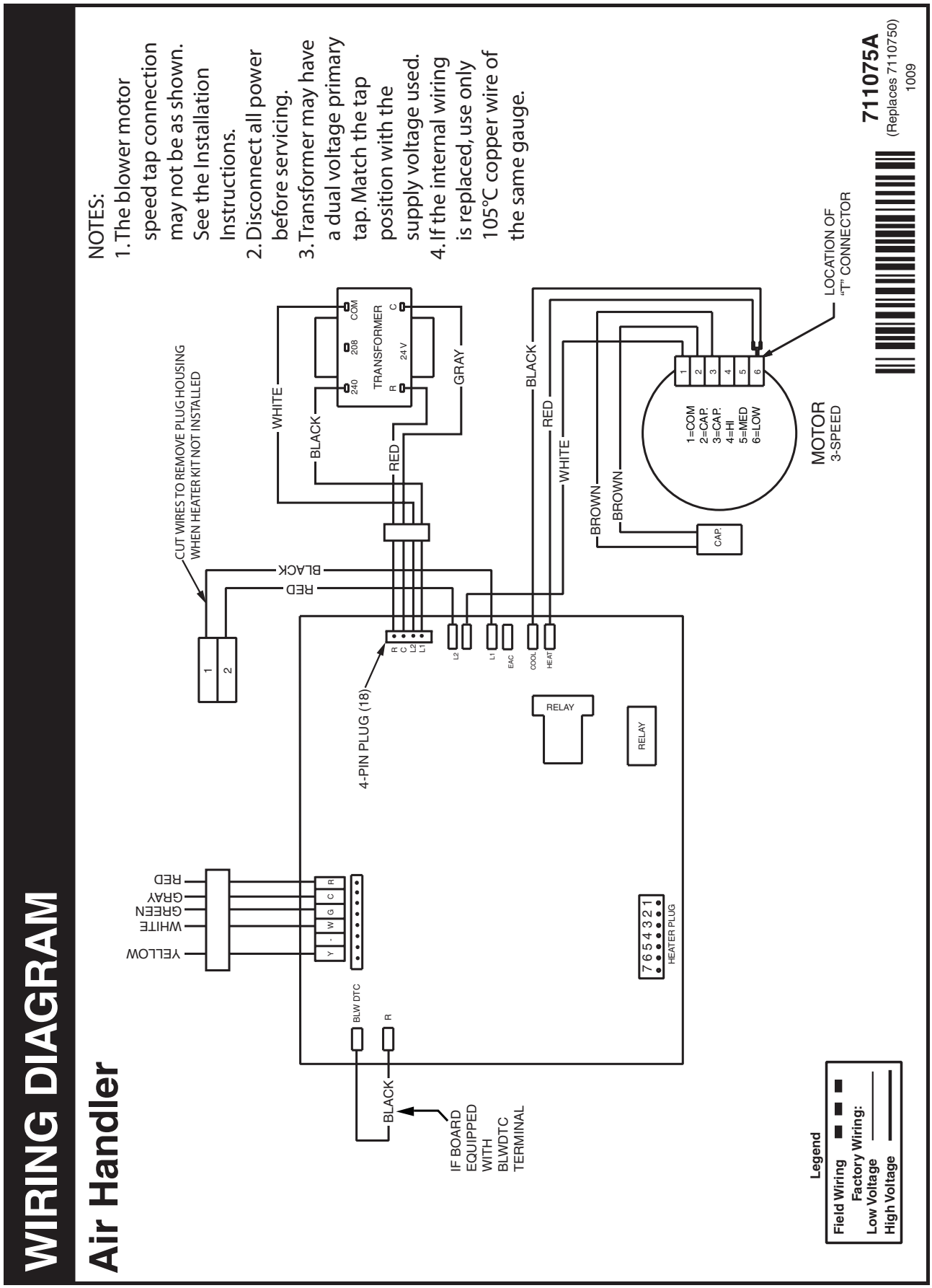


Figure 18. Wiring Diagram for HMGF1E Series Air Handler**

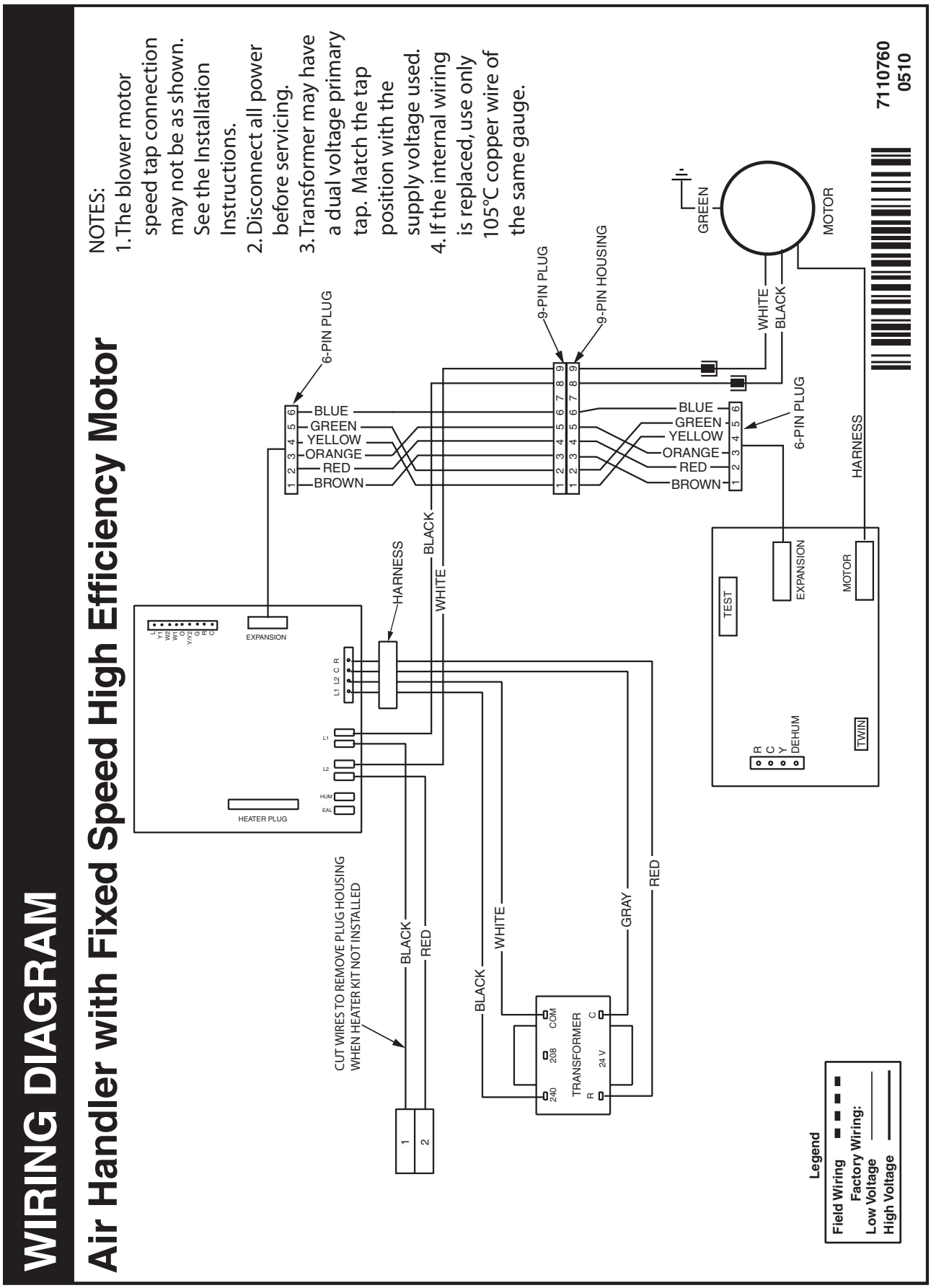


Figure 19. Wiring Diagram for HMGX1E Series Air Handler**

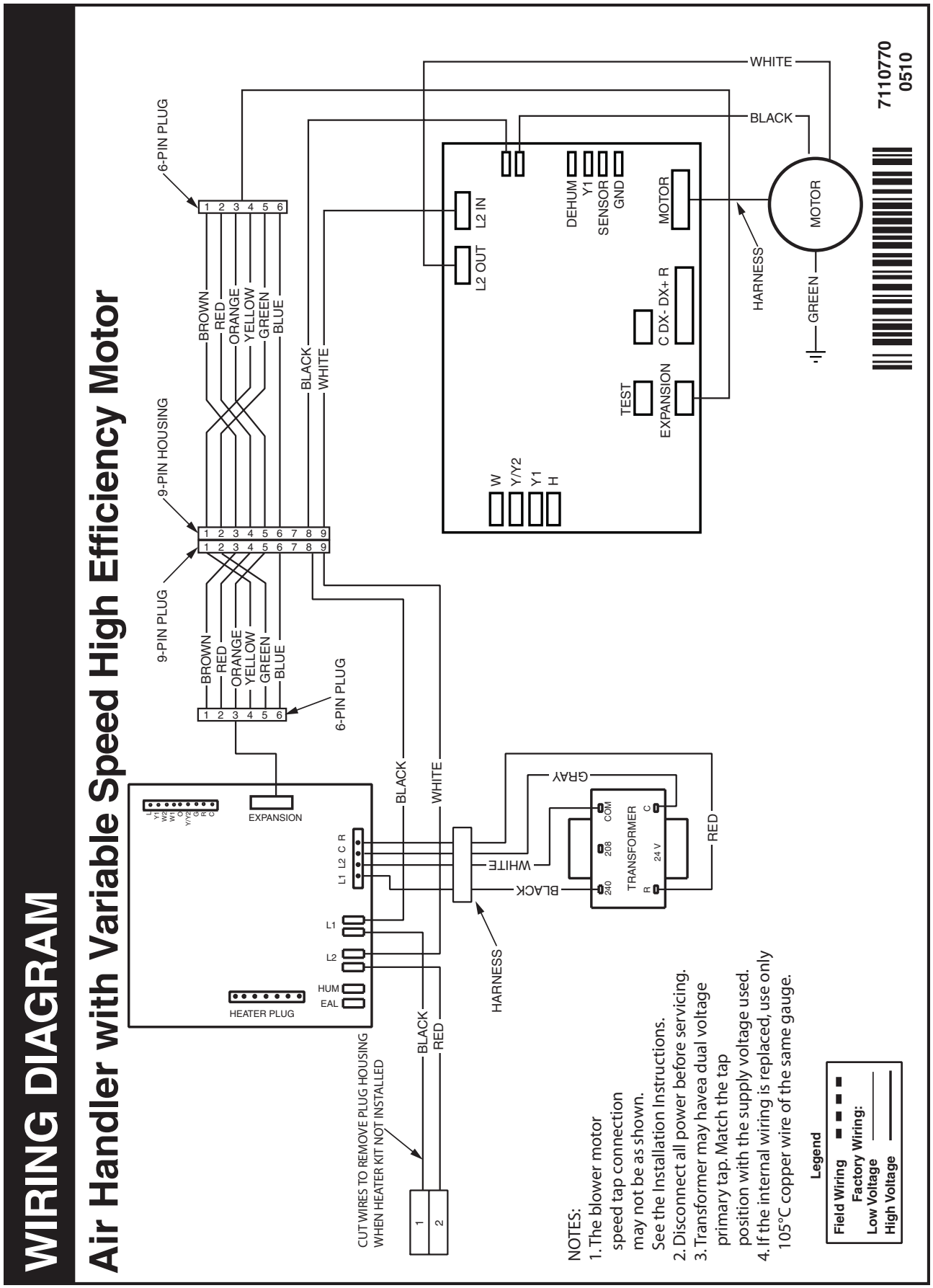


Figure 20. Wiring Diagram for HCGV1E Series Air Handler**

HMG**F1E SERIES																	
AIR HANDLER MODEL	HEAT KIT MODEL NUMBER H6HK-	240 VAC, 50 & 60 HZ, SINGLE PHASE								208 VAC, 50 & 60 HZ, SINGLE PHASE							
		MCA				MOP				MCA				MOP			
		CIRCUIT A	CIRCUIT B	CIRCUIT C	SINGLE CIRCUIT	CIRCUIT A	CIRCUIT B	CIRCUIT C	SINGLE CIRCUIT	CIRCUIT A	CIRCUIT B	CIRCUIT C	SINGLE CIRCUIT	CIRCUIT A	CIRCUIT B	CIRCUIT C	SINGLE CIRCUIT
HMG24F1E	None	1.6	-	-	1.6	15	-	-	15	1.6	-	-	1.6	15	-	-	15
	005H-XX	26.6	-	-	26.6	30	-	-	30	23.3	-	-	23.3	25	-	-	25
	008H-XX	41.2	-	-	41.2	45	-	-	45	35.9	-	-	35.9	40	-	-	40
	010H-XX	51.6	-	-	51.6	60	-	-	60	45.0	-	-	45.0	45	-	-	45
	009Q-XX	-	-	-	28.7	-	-	-	30	-	-	-	18.8	-	-	-	30
HMG30F1E	None	3.1	-	-	3.1	15	-	-	15	3.1	-	-	3.1	15	-	-	15
	005H-XX	28.1	-	-	28.1	30	-	-	30	24.8	-	-	24.8	25	-	-	25
	008H-XX	42.7	-	-	42.7	45	-	-	45	37.4	-	-	37.4	40	-	-	40
	010H-XX	53.1	-	-	53.1	60	-	-	60	46.5	-	-	46.5	50	-	-	50
	015H-XX	53.1	25.0	-	65.6	60	30	-	80	46.5	21.7	-	68.1	50	25	-	70
	009Q-XX	-	-	-	30.2	-	-	-	35	-	-	-	26.6	-	-	-	30
	015Q-XX	-	-	-	46.4	-	-	-	50	-	-	-	40.6	-	-	-	45
HMG36F1E	None	2.6	-	-	2.6	15	-	-	15	2.6	-	-	2.6	15	-	-	15
	005H-XX	27.6	-	-	27.6	30	-	-	30	24.3	-	-	24.3	25	-	-	25
	008H-XX	42.2	-	-	42.2	45	-	-	45	36.9	-	-	36.9	40	-	-	40
	010H-XX	52.6	-	-	52.6	60	-	-	60	46.0	-	-	46.0	50	-	-	50
	015H-XX	52.6	25.0	-	64.7	60	30	-	80	46.0	21.7	-	67.6	50	25	-	70
	020H-XX	52.6	50.0	-	102.6	60	60	-	110	46.0	43.3	-	89.3	50	45	-	90
	009Q-XX	-	-	-	29.7	-	-	-	30	-	-	-	26.1	-	-	-	30
	015Q-XX	-	-	-	45.9	-	-	-	50	-	-	-	40.2	-	-	-	45
HMG42F1E	None	3.1	-	-	3.1	15	-	-	15	3.1	-	-	3.1	15	-	-	15
	005H-XX	28.1	-	-	28.1	30	-	-	30	24.8	-	-	24.8	25	-	-	25
	008H-XX	42.7	-	-	42.7	45	-	-	45	37.4	-	-	37.4	40	-	-	40
	010H-XX	53.1	-	-	53.1	60	-	-	60	46.5	-	-	46.5	50	-	-	50
	015H-XX	53.1	25.0	-	65.6	60	30	-	80	46.5	21.7	-	68.1	50	25	-	70
	020H-XX	53.1	50.0	-	103.1	60	60	-	110	46.5	43.3	-	89.8	50	45	-	90
	009Q-XX	-	-	-	30.2	-	-	-	35	-	-	-	26.6	-	-	-	30
	015Q-XX	-	-	-	46.4	-	-	-	50	-	-	-	40.7	-	-	-	45
HMG48F1E	None	5.4	-	-	5.4	15	-	-	15	5.4	-	-	5.4	15	-	-	15
	005H-XX	30.4	-	-	30.4	35	-	-	35	27.0	-	-	27.0	30	-	-	30
	008H-XX	45.0	-	-	45.0	45	-	-	45	39.7	-	-	39.7	40	-	-	40
	010H-XX	55.4	-	-	55.4	60	-	-	60	48.7	-	-	48.7	50	-	-	50
	015H-XX	55.4	25.0	-	80.4	60	30	-	90	48.7	21.7	-	70.4	50	25	-	80
	020H-XX	55.4	50.0	-	105.4	60	60	-	110	48.7	43.3	-	92.0	50	45	-	100
	024H-XX	55.4	50.0	25.0	130.4	60	60	60	150	48.7	43.3	21.7	113.7	50	45	45	125
	029H-XX	55.4	50.0	50.0	155.4	60	60	60	175	48.7	43.3	43.3	135.4	50	45	45	150
	009Q-XX	-	-	-	32.4	-	-	-	35	-	-	-	28.8	-	-	-	30
	015Q-XX	-	-	-	48.7	-	-	-	50	-	-	-	42.9	-	-	-	45
HMG60F1E	None	6.3	-	-	6.3	15	-	-	15	6.8	-	-	6.8	15	-	-	15
	005H-XX	31.3	-	-	31.3	35	-	-	35	28.4	-	-	28.4	30	-	-	30
	008H-XX	45.8	-	-	45.8	50	-	-	50	41.1	-	-	41.1	45	-	-	45
	010H-XX	56.3	-	-	56.3	60	-	-	60	50.1	-	-	50.1	60	-	-	60
	015H-XX	56.3	25.0	-	81.3	60	30	-	90	50.1	21.7	-	71.8	60	25	-	80
	020H-XX	56.3	50.0	-	106.3	60	60	-	110	50.1	43.3	-	93.4	60	45	-	100
	024H-XX	56.3	50.0	25.0	131.3	60	60	30	150	50.1	43.3	21.7	115.1	60	45	25	125
	029H-XX	56.3	50.0	50.0	156.3	60	60	60	175	50.1	43.3	43.3	136.8	60	45	45	150
	009Q-XX	-	-	-	33.3	-	-	-	35	-	-	-	30.2	-	-	-	35
	015Q-XX	-	-	-	49.6	-	-	-	50	-	-	-	44.3	-	-	-	45

Table 10. HMGF1E Series Minimum Circuit Ampacity & Maximum Overcurrent Protection**

HMG**X1E & HCG**V1E																	
AIR HANDLER MODELS	HEAT KIT MODEL NUMBER H6HK-	240 VAC, 50 & 60 HZ, SINGLE PHASE								208 VAC, 50 & 60 HZ, SINGLE PHASE							
		MCA				MOP				MCA				MOP			
		CIRCUIT A	CIRCUIT B	CIRCUIT C	SINGLE CIRCUIT	CIRCUIT A	CIRCUIT B	CIRCUIT C	SINGLE CIRCUIT	CIRCUIT A	CIRCUIT B	CIRCUIT C	SINGLE CIRCUIT	CIRCUIT A	CIRCUIT B	CIRCUIT C	SINGLE CIRCUIT
HMG24X1E HMG30X1E & HCG24V1E HCG30V1E	None	4.5	-	-	4.5	15	-	-	15	4.8	-	-	4.8	15	-	-	15
	005H-XX	29.5	-	-	29.5	30	-	-	30	26.4	-	-	26.4	30	-	-	30
	008H-XX	44.1	-	-	44.1	45	-	-	45	39.1	-	-	39.1	40	-	-	40
	010H-XX	54.5	-	-	54.5	60	-	-	60	48.1	-	-	48.1	50	-	-	50
	015H-XX	54.5	25.0	-	68.1	60	30	-	80	48.1	21.7	-	69.8	50	25	-	70
	009Q-XX	-	-	-	31.6	-	-	-	35	-	-	-	28.2	-	-	-	30
	015Q-XX	-	-	-	47.8	-	-	-	50	-	-	-	42.3	-	-	-	45
HMG36X1E HMG42X1E & HCG36V1E HCG42V1E	None	4.5	-	-	4.5	15	-	-	15	4.8	-	-	4.8	15	-	-	15
	005H-XX	29.5	-	-	29.5	30	-	-	30	26.4	-	-	26.4	30	-	-	30
	008H-XX	44.1	-	-	44.1	45	-	-	45	39.1	-	-	39.1	40	-	-	40
	010H-XX	54.5	-	-	54.5	60	-	-	60	48.1	-	-	48.1	50	-	-	50
	015H-XX	54.5	25.0	-	68.1	60	30	-	80	48.1	21.7	-	69.8	50	25	-	70
	020H-XX	54.5	50.0	-	104.5	60	60	-	110	48.1	43.3	-	91.4	50	45	-	100
	009Q-XX	-	-	-	31.6	-	-	-	35	-	-	-	28.2	-	-	-	30
	015Q-XX	-	-	-	47.8	-	-	-	50	-	-	-	42.3	-	-	-	45
HMG48X1E HMG60X1E & HCG48V1E HCG60V1E	None	6.3	-	-	6.3	15	-	-	15	6.8	-	-	6.8	15	-	-	15
	005H-XX	31.3	-	-	31.3	35	-	-	35	28.4	-	-	28.4	30	-	-	30
	008H-XX	45.8	-	-	45.8	50	-	-	50	41.1	-	-	41.1	45	-	-	45
	010H-XX	56.3	-	-	56.3	60	-	-	60	50.1	-	-	50.1	60	-	-	60
	015H-XX	56.3	25.0	-	81.3	60	30	-	90	50.1	21.7	-	71.8	60	25	-	80
	020H-XX	56.3	50.0	-	106.3	60	60	-	110	50.1	43.3	-	93.4	60	45	-	100
	024H-XX	56.3	50.0	25.0	131.3	60	60	60	150	50.1	43.3	21.7	115.1	60	45	45	125
	029H-XX	56.3	50.0	50.0	156.3	60	60	60	175	50.1	43.3	43.3	136.8	60	45	45	150
	009Q-XX	-	-	-	33.3	-	-	-	35	-	-	-	30.2	-	-	-	35
	015Q-XX	-	-	-	49.6	-	-	-	50	-	-	-	44.3	-	-	-	45

Table 11. HMGX1E & HCG**V1E Minimum Circuit Ampacity & Maximum Overcurrent Protection**

CONTROL SIGNAL & MODE	OPERATION	TOTAL KW	BOARD ACTION
W1 only EHEAT	ON	5 KW	Stage 1 Heat on instantly
			Heat blower on after 3 second delay
		10 KW	Stage 1 Heat on instantly
			Heat blower on after 3 second delay
		15 KW	Stage 1 Heat on instantly
			Heat blower on after 3 second delay
			Stage 2 Heat on after 5 second delay
		20 KW	Stage 1 Heat on instantly
			Heat blower on after 3 second delay
			Stage 2 Heat on after 5 second delay
			Stage 3 Heat on after 10 second delay
		25 KW	Stage 1 Heat on instantly
			Heat blower on after 3 second delay
			Stage 2 Heat on after 5 second delay
			Stage 3 Heat on after 10 second delay
		30 KW	Stage 1Heat on instantly
			Heat blower on after 3 second delay
			Stage 2 Heat on after 5 second delay
			Stage 3 Heat on after 10 second delay
			Stage 4 Heat on after 15 second delay
	OFF		Heat stages off instantly
			Blower off after 15 second delay

Table 12. Control Board Operation

CONTROL SIGNAL & MODE	OPERATION	TOTAL KW	BOARD ACTION
W1 & W2 EHEAT	ON	5 KW	Stage 1 Heat on instantly
			Heat blower on after 3 second delay
		10 KW	Stage 1 Heat on instantly
			Heat blower on after 3 second delay
			Stage 2 Heat on after 5 seconds delay
		15 KW	Stage 1 Heat on instantly
			Heat blower on after 3 second delay
			Stage 2 Heat on after 5 seconds delay
			Stage 3 Heat on after 10 seconds delay
		20 KW	Stage 1 Heat on instantly
			Heat blower on after 3 second delay
			Stage 2 Heat on after 5 seconds delay
			Stage 3 Heat on after 10 seconds delay
			Stage 4 Heat on after 15 seconds delay
		25 KW	Stage 1 Heat on instantly
			Heat blower on after 3 second delay
			Stage 2 Heat on after 5 seconds delay
			Stage 3 Heat on after 10 seconds delay
			Stage 4 Heat on after 15 seconds delay
			Stage 5 Heat on after 20 seconds delay
		30 KW	Stage 1Heat on instantly
			Heat blower on after 3 second delay
			Stage 2 Heat on after 5 seconds delay
			Stage 3 Heat on after 10 seconds delay
			Stage 4 Heat on after 15 seconds delay
			Stage 5 Heat on after 20 seconds delay
			Stage 6 Heat on after 25 seconds delay
	OFF		Heat stages off instantly
			Blower off after 15 second delay
W1 & Y/Y2 AUX HEAT	ON	5 KW	Stage 1 Heat on instantly
			Cool blower on after 3 second delay
		10 KW	Stage 1 Heat on instantly
			Cool blower on after 3 second delay
		15 KW	Stage 1 Heat on instantly
			Cool blower on after 3 second delay
			Stage 2 Heat on after 5 seconds delay
		20 KW	Stage 1 Heat on instantly
			Cool blower on after 3 second delay
			Stage 2 Heat on after 5 seconds delay
			Stage 3 Heat on after 10 seconds delay
		25 KW	Stage 1 Heat on instantly
			Cool blower on after 3 second delay
			Stage 2 Heat on after 5 seconds delay
			Stage 3 Heat on after 10 seconds delay
		30 KW	Stage 1 Heat on instantly
			Cool blower on after 3 second delay
			Stage 2 Heat on after 5 seconds delay
			Stage 3 Heat on after 10 seconds delay
			Stage 4 Heat on after 15 seconds delay
	OFF		Heat stages off instantly
			Heat blower turns off after 40 second delay

Table 12. Control Board Operation - Continued

CONTROL SIGNAL & MODE	OPERATION	TOTAL KW	BOARD ACTION
W1, W2 & Y/Y2 AUX HEAT	ON	5 KW	Stage 1 Heat on instantly
			Cool blower on after 3 second delay
		10 KW	Stage 1 Heat on instantly
			Cool blower on after 3 second delay
			Stage 2 Heat on after 5 seconds delay
		15 KW	Stage 1 Heat on instantly
			Cool blower on after 3 second delay
			Stage 2 Heat on after 5 seconds delay
			Stage 3 Heat on after 30 seconds delay
		20 KW	Stage 1 Heat on instantly
			Cool blower on after 3 second delay
			Stage 2 Heat on after 5 seconds delay
			Stage 3 Heat on after 10 seconds delay
			Stage 4 Heat on after 15 seconds delay
		25 KW	Stage 1Heat on instantly
			Cool blower on after 3 second delay
			Stage 2 Heat on after 5 seconds delay
			Stage 3 Heat on after 10 seconds delay
			Stage 4 Heat on after 15 seconds delay
			Stage 5 Heat on after 20 seconds delay
		30 KW	Stage 1Heat on instantly
			Cool blower on after 3 second delay
			Stage 2 Heat on after 5 seconds delay
			Stage 3 Heat on after 10 seconds delay
			Stage 4 Heat on after 15 seconds delay
			Stage 5 Heat on after 20 seconds delay
			Stage 6 Heat on after 25 seconds delay
	OFF		Heat stages off instantly
			Heat blower turns off after 40 second delay
G FAN	On		Fan blower on after 3 second delay
	Off		Fan blower off instantly
Y/Y2 HEAT PUMP & COOL	On		Cool blower on after 3 second delay
	Off		Cool blower off after 40 second delay
Y1 HEAT PUMP & COOL	On		Cool blower on after 3 second delay
	Off		Cool blower off after 40 second delay
Y1 & Y/Y2 HEAT PUMP & COOL	On		Cool blower on after 3 second delay
	Off		Cool blower off after 40 second delay

Table 12. Control Board Operation - Continued

INSTALLATION / PERFORMANCE CHECK LIST

INSTALLER NAME:		
CITY:	STATE:	
INSTALLATION ADDRESS:		
CITY:	STATE:	
UNIT MODEL #		
UNIT SERIAL #		
Minimum clearances per page 4?	YES	NO
Is the unit properly installed and leveled?	YES	NO
Does condensate drain properly in both drain tubes?	YES	NO
Has the owner's information been reviewed with the home-owner?	YES	NO
Has the literature package been left near the appliance?	YES	NO

ELECTRICAL SYSTEM:		
Electrical connections tight?	YES	NO
Line voltage polarity correct?	YES	NO
Supply Voltage: _____(V)		
Has the thermostat been calibrated?	YES	NO
Is the thermostat level?	YES	NO
Is the heat anticipator setting correct?	YES	NO

ATTENTION INSTALLERS:

It is your responsibility to know this product better than your customer. This includes being able to install the product according to strict safety guidelines and instructing the customer on how to operate and maintain the equipment for the life of the product. Safety should always be the deciding factor when installing this product and using common sense plays an important role as well. Pay attention to all safety warnings and any other special notes highlighted in the manual. Improper installation of the air handler or failure to follow safety warnings could result in serious injury, death, or property damage.

These instructions are primarily intended to assist qualified individuals experienced in the proper installation of this appliance. Some local codes require licensed installation/service personnel for this type of equipment. Please read all instructions carefully before starting the installation. Return these instructions to the customer's package for future reference.

USA DESIGNED & ASSEMBLED

ENERGY STAR

AHRI CERTIFIED™ www.ahridirectory.org

C ETL LISTED US Intertek

HEAT CONTROLLER, INC.

Specifications & illustrations subject to change without notice or incurring obligations.
Jackson, MI | Printed in U.S.A. (09/12)

7095570 (Replaces 7095090)